BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF: WATER QUALITY STANDARDS AND EFFLUENT LIMITATIONS FOR THE CHICAGO AREA WATERWAYS SYSTEM (CAWS) AND THE LOWER DES PLAINES RIVER: PROPOSED AMENDMENTS TO 35 Ill. Adm. Code Parts 301, 302, 303 and 304 (Aquatic Life Use Designations)	)))))))))	R08-09 Subdocket C (Rulemaking- Water)

NOTICE OF FILING

To:

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Please take notice that on the 5th Day of March, 2012, I filed with the Office of the Clerk of the Illinois Pollution Control Board the attached **Environmental Groups' Post Hearing Comments Regarding Aquatic Life use Designations for the Chicago Area Waterways System and Lower Des Plaines River**, a copy of which is hereby served upon you.

By: Ann Alexander
Ann Alexander, Natural Resources Defense Council

Dated: March 5th, 2012

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CERTIFICATE OF SERVICE

I, Ann Alexander, the undersigned attorney, hereby certify that I have served the attached **Environmental Groups' Post Hearing Comments Regarding Aquatic Life use Designations for the Chicago Area Waterways System and Lower Des Plaines River** on all parties of record (Service List attached), by depositing said documents in the United States Mail, postage prepaid, from 227 W. Monroe, Chicago, IL 60606, before the hour of 5:00 p.m., on this 5^{h} Day of March, 2012.

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BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF: WATER QUALITY STANDARDS AND EFFLUENT LIMITATIONS FOR THE CHICAGO AREA WATERWAYS SYSTEM (CAWS) AND THE LOWER DES PLAINES RIVER: PROPOSED AMENDMENTS TO 35 Ill. Adm. Code Parts 301, 302, 303 and 304 (Aquatic Life Use Designations)	)))))))))	R08-09 Subdocket C (Rulemaking- Water)

ENVIRONMENTAL GROUPS' POST HEARING COMMENTS REGARDING AQUATIC LIFE USE DESIGNATIONS FOR THE CHICAGO AREA WATERWAYS SYSTEM AND LOWER DES PLAINES RIVER

Environmental Law & Policy Center, Natural Resources Defense Council, Openlands, Friends of the Chicago River, Southeast Environmental Task Force, Prairie Rivers Network, Alliance for the Great Lakes and the Illinois Chapter of Sierra Club ("Environmental Groups") submit these comments regarding proposed aquatic life use designations for the Chicago Area Waterways System ("CAWS") and the Lower Des Plaines River ("LDPR").

In large part these comments support the proposals for aquatic life use designations the Illinois Environmental Protection Agency ("IEPA") made in its 2007 petition. However, as to some of the water segments of the CAWS proposed to be designated for less–than–fully "fishable" uses, the showing necessary under 40 CFR § 131.10 (g) for a sub-fishable designation has not been made. Further, for some of the segments of the CAWS proposed to be designated "Aquatic Life Use B," evidence regarding existing aquatic life and potential habitat improvements that was not available to IEPA at the time of the filing of its proposal shows that early life stages of aquatic life should be protected in water segments that it was not thought necessary to protect for this use in 2007.

As to particular water bodies and segments, the record:

- Shows that IEPA's proposed designation for the Upper Dresden Island Pool ("UDP") should be adopted by the Board;
- Does not support downgrading the northern portion of the North Shore Channel ("NSC"), the Main Stem of the Chicago River or the Calumet River between the O'Brien Locks and Lake Michigan, all of which are now designated General Use;
- Supports the IEPA proposals that the portion of the NSC below the North Side Treatment Plant, the portion of the North Branch of the Chicago River above Goose Island, Lake Calumet, the Calumet Sag Channel, the Grand Calumet River and the Little Calumet River be designated "Aquatic Life Use A."
- Does not support designations less than "Aquatic Life Use A" for the portion of the North Branch of the Chicago River below Goose Island, the South Branch of the Chicago River, the Lower Des Plaines River from its

confluence with the Chicago Sanitary and Ship Canal to the Brandon Road Lock and Dam or the Lake Calumet Connecting Channel.[1]

In sum, these are the use designations that are supported by the record:

Upper Dresden Island Pool	Upper Dresden Island Pool Aquatic Life Use
Brandon Pool	Aquatic Life Use A
Chicago Sanitary and Ship Canal	Aquatic Life Use B
Calumet-Sag Channel	Aquatic Life use A
Little Calumet River	Aquatic Life Use A
Grand Calumet River	Aquatic Life Use A
Lake Calumet	Aquatic Life Use A
Lake Calumet Connecting Channel	Aquatic Life Use A
Calumet River up to O'Brien Locks	Aquatic Life Use A
Calumet River between O'Brien Locks and Lake Michigan	General Use
South Branch of the Chicago River	Aquatic Life Use A
South Fork of South Branch Chicago River (Bubbly Creek)	New Subdocket
Chicago River	General Use
North Branch Chicago River	Aquatic Life Use A
North Shore Channel below North Side WRP	Aquatic Life Use A
North Shore Channel above North Side WRP	General Use

Below we will first describe legal and factual principles that are central to considering the proper designations for the various segments of the LDPR and the CAWS (Section I). We will then will apply those principles and consider the evidence in the record as to the UDP (Section II) and to various segments of the CAWS and the Brandon Pool of the Des Plaines (Section III). Finally, we will discuss the relevance, or rather irrelevance, of the fact that Asian carp and Asian carp DNA has been found in portions of the LDPR and the CAWS (Section IV).

[1] On March 5, 2012, MWRD and the Environmental Groups will file a joint motion to create a new subdocket for Bubbly Creek.

I. The Applicable Legal Presumptions and the Facts Appearing in the Record Support the UDP Aquatic Life Use and Support More Protective Use Designations for the CAWS and Brandon Pool.

The narrow scope of the issues presented in Subdocket C, as well as the narrow scope for consideration of economic factors in use attainability analysis ("UAA") proceedings generally, largely limits the relevant issues here to those concerning the currently existing habitat and aquatic life and possible future habitat and aquatic life in the various water bodies and segments. Regarding habitat, certain logical and ecological principles require that biological systems be considered as a whole, and that the current state of aquatic life in a system not be overemphasized in considering what is attainable.

A. There is a Rebuttable Presumption that All Waters Should Be Given Use Designations That Meet "Fishable" Goals

As has been explained several times in this proceeding, 40 CFR § 131.10(g), which governs UAAs, establishes a rebuttable presumption that fishable/swimmable uses are attainable. *Idaho Mining Association Inc. v. Browner*, 90 F. Supp. 2d 1078 (D. Idaho 2000). The Clean Water Act ("CWA") charges states with setting water quality standards, which are subject to approval by the United States Environmental Protection Agency ("USEPA"). 33 U.S.C. § 1313(c). *See also* 40 CFR § 131.2. A critical element of that standard-setting process is the requirement that states review use designations that fall short of the CWA goal of achieving water quality that provides for meeting the "fishable and swimmable" standard. 33 U.S.C. § 1251(a)(2). States must upgrade water quality standards to the extent possible to protect aquatic life uses, unless they can prove through a UAA that at least one of six federal factors precludes aquatic life uses. Designations must protect all existing uses. *See* 40 C.F.R. § 131.11(g), (h).

B. Evidence in Support of the Non-Fishable Designations Fails to Take Fully Into Account Fish Mobility

The central issue in this Subdocket C as to each relevant segment is whether the habitat is so poor in that reach and so infeasible to improve in the foreseeable future that the public should resign itself to having a poor aquatic community. In making this judgment, IEPA and other parties relied heavily on a tool for assessing habitat, the Qualitative Habitat Evaluation Index (“QHEI”), as a major test for whether or not the habitat is so poor that fishable uses are unattainable. *See e.g*., Prefiled Testimony of Rob Sulski (Ex. 1), the Camp Dresser McGee (“CDM”) Report (Attachment B to the IEPA proposal) p. 5-9, and the report submitted by Edward Rankin of the Midwest Biodiversity Institute (Attachment R).

The QHEI is a useful tool for determining the current habitat conditions in a body of water, and the data IEPA collected are helpful in characterizing the habitat conditions in this system. However, the record shows that the QHEI understates the potential habitat quality of water body segments for two reasons. First, the QHEI does not sufficiently take into account the fact that because fish can swim, necessary habitat need not be present in every portion of a water body under consideration. Connected bodies of water may supply habitat that is necessary for fish. Since fish swim, it is not possible to draw firm conclusions about habitat, or the possibility of supporting particular species, based on studies of particular sites within a connected system. If there is one good breeding area either in or connected to the water body in question, that may be enough for the species to be there in number. Thomas Testimony, 8/14/09, at 67-68, 73, 81; Barghusen Testimony,10/5/09 at 124. In other words, it is not proper to look at a connected system piecemeal. One must consider how the total system functions, or in this proceeding could function if water quality were improved and habitat projects were built.

Dr. David Thomas explained this during his August 14, 2009 testimony in discussing the UDP:

> I really think the QHEI scores for this system, and … probably for large rivers in general, probably underestimate the available habitat that's available to fish in these systems. In other words, I think these scores ... might not represent the variety of habitats that might be available to species in the system. …..
>
> When you get to really large rivers, you might be lucky to have [a riffle] every 10, 15 miles. Does that mean that riffle is only available to fish within 500 meters of that 500-meter section? Most large river fish are able to move, if they need riffle habitat, and they do move fairly large distances, maybe up a tributary stream and up a main river to get to a riffle habitat.
> 8/14/09 at 64-66.

This fact stands in contrast to some testimony in this case that suggested that the only habitat available to a fish during its lifetime was the habitat available at a particular habitat point. For example, it was opined or suggested that walleye, red horse or other fish species cannot live in a water body unless there are places for them to build nests in most or all of the locations in that water body. *See, e.g.,* Testimony of Greg Seegert, 11/9/09, Tr. 28. Likewise, the Metropolitan Water Reclamation District ("MWRD") habitat study did not consider the habitat in any of the tributaries to the CAWS. *See* Bell, 5/16/11, Tr. 51. Using such logic, one might conclude that the Pacific Ocean is not good habitat for Pacific Salmon because salmon do not breed or hatch in the ocean.[2] As a result of these narrow interpretations of habitat data, we have not been presented with an accurate characterization of the potential for Jackson Creek, Hickory Creek, Spring Creek, the Kankakee River and the Upper Des Plaines River to serve as a nursery for fish that could live in the UDP if water quality improved. Similarly, the attainable uses in the CAWS have largely been discussed without due consideration being given to the waters that are or could be connected to the CAWS including the North Branch of the Chicago River above the confluence with the North Shore Channel, the Little Calumet River, and Lake Michigan.

Further, the Board should consider how the use designation of the water bodies in question may affect the aquatic life in the waters to which they are connected, because bad quality that is allowed in a water body may harm the ecology of connected water reaches. For example, the Illinois Department of Natural Resources ("IDNR") has stated that "the lower Des Plaines River is water quality impaired and has reduced fish diversity compared to unimpaired rivers in the region (*e.g.* Kankakee River). As a result, Hickory Creek has fewer species than many similar sized watersheds, with only 4 intolerant species present." *See* IDNR Division of Fisheries, Region 2 Streams Program "Status of Fish Communities and Stream Quality in the Hickory Creek Watershed, June 2006" (Ex. 342). Poor water quality in the LDPR has the potential to harm the species in Jackson Creek and other waters connected to the LDPR because "tributaries recruit species from connecting rivers when local events such as pollution or drought result in a decline in numbers." Pre-filed Testimony of Laura Barghusen (Ex. 338) p. 7.

Water temperatures or low dissolved oxygen levels in the LDPR outside the tolerance limit of stream species will leave the stream species with no place to run in the case of a drought,

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[2] Of course, as we know, salmon breed in streams, mature in oceans and return to freshwater streams and rivers where they spawn. Montgomery, D.R., King of Fish, (Westview 2003) p. 15.

spill or other severe event in the stream. As Ms. Laura Barghusen explained with regard to one of the UDP tributaries, Jackson Creek:

> The Illinois Department of Natural Resources has stated that, "the Jackson Creek Watershed, which is a tributary to the degraded Des Plaines River, is somewhat isolated from quality recruitment sources and is more vulnerable to local extirpations resulting from droughts, floods, or water quality problems. …." Barghusen 10/5/09, Tr. 84-85, citing Ex. 339. [T]he way that [river] systems recover … and continue to have sustained low populations of animals over time is that animals immigrate back into that system from some nearby place that has that species. *Id.* at 80-81.
>
> So as examples, sucker species, which include the Redhorses in 2003, were noted in the [IDNR] Jackson Creek report to be at lower levels than expected, and darter species were as well, based on available habitat for them in the creek. *Id.* at 89.
>
> So what we're looking at here is … some really high quality streams like the Kankakee River and the Lower Du Page River, that could provide species to Jackson Creek, and we're looking to ensure … that the Lower Des Plaines River has adequate water qualities to [be] the corridor thorough which species will travel into Jackson Creek. *Id.* at 85.

B. Aquatic Habitat Can Be Created and Water Quality Can Be Improved Within the Time Frame That Should be Considered by the Board

The second reason why the QHEI understates the potential for aquatic use attainment is that it does not take into account the potential for habitat improvement. There is no doubt that habitat, like water quality, can be improved over time. *See* Testimony of Dr. David Thomas, 8/14/09, Tr. 93 ("There's always lots of things you can do to improve fish habitat.") While there has been some evidence offered in this proceeding regarding potential habitat improvements, it has not been shown that it would be infeasible to make substantial habitat improvements within the relevant time period. Indeed, Dr. Thomas and Midwest Generation consultant Greg Seegert both testified that the habitat in the UDP could be improved. Thomas 8/14/09, Tr. 47; Seegert 11/9/09, Tr. 22. Similarly, the Limnotech Habitat Evaluation Report (PC 284), presented by MWRD, limited in breadth as it is, shows significant potential for improvement for various reaches of the CAWS. Moreover, studies and preliminary proposals for the CAWS show potential for improvements that would benefit portions of these waterways. *See, e.g.* the restoration section in "Openlands Answer by Jerry Adelmann, Openlands to MWRD Prefiled Question No. 1 in R08-09" (Ex. 354) at 8-11. Given the mobility of fish, better connecting the Upper North Branch of the Chicago River with the CAWS, for example, might provide breeding areas for a number of fish species that could live in all of the portions of the CAWS connected to the North Branch.

Indeed, cooperatively-developed proposals are currently on the table to achieve habitat improvement. MWRD and the Environmental Groups have worked together to develop a set of habitat improvement projects that they agree are feasible and beneficial. Descriptions of those projects are attached as Exhibit 1.

This raises the question of determining what the relevant time period is for potential habitat improvements. Section 303(c) of the CWA, 33 U.S.C. § 1313(c) (1), can be read to require that a UAA for these waters be done every three years and that, accordingly, three years should be the relevant time frame. To take three years as the answer, however, would be extremely naïve. This proceeding has been before the Board more than four years and, with the studies that led up to this time, the UAA has already lasted over a decade. Moreover, the necessary work to improve habitat or water quality will often take longer than three years to complete. Limiting consideration here to a three-year period would basically condemn the LDPR and the CAWS to maintaining the status quo in perpetuity. The Board would invariably conclude every three years that nothing can be changed in that tight time frame, resulting in no required improvements. This cuts against the purpose of the CWA for all waterways to ultimately be "fishable and swimmable."

A more relevant time period would be ten to twenty years from the expected completion date of the UAA. This is the time period suggested by IEPA in its initial statement of reasons, (Statement of Reasons p. 23), and is commensurate with the planning range for projects by MWRD, the Chicago Department of Environment, U.S. Army Corps of Engineers, and other relevant agencies. Openlands Answer to Pre-filed Questions Ex. 354. There is no reason to believe that important habitat improvements could not be made to both the LDPR and the CAWS within a ten-year period after work was initiated.

C. Economic Considerations, Generally Limited in UAA Proceedings, are Irrelevant to Subdocket C

IEPA did not rely in its petition on 40 CFR § 131.10(g)(6), which provides that a water body may in some limited circumstances be designated for a sub-fishable use where it would cause "widespread economic and social impact," as supporting a sub-fishable designation for any portion of the LDPR or the CAWS.[3] Particularly given how the proceeding has been partitioned,

[3] USEPA Factor 6 Guidance states that "[d]emonstration of substantial financial impacts is not sufficient reason to modify a use …. Rather, the applicant must also demonstrate that compliance would create widespread socioeconomic impacts on the affected community." USEPA Factor 6 Guidance, p. 1-5. The federal guidance document provides a five-step test that evaluates the scope and type of impacts to the median household income in a rulemaking area. See USEPA Factor 6 Guidance, p. 1-7. Particularly as it is clear that the legislature intended Illinois to conduct its water pollution control program in compliance with federal requirements, 415 ILCS 5/4(l),

it is clear that economic factors are irrelevant to Subdocket C. The use designation does not require any particular pollution technology or in itself any controls at all until the criteria have been developed. Thus, the mere designation of a use does not have any tangible economic effect.

Of course, before the subdockets were created, various parties put in evidence based on their understanding of the IEPA-proposed criteria. After the subdockets were created, various parties have sometimes attacked use designations based on their assumption of what those designations would mean as to the criteria that will eventually be adopted. However, it is possible that weaker or stronger criteria will be adopted for temperature, DO and other parameters than those proposed by IEPA no matter what use designations are adopted and the parties have already shown that they have drastically different views of what criteria are necessary to protect the various designated uses. Unless the Board desires to hear all the possible economic arguments twice - once based on speculation as to what criteria might be adopted to protect various uses and again when the criteria are actually considered - it is clear that this Subdocket C should focus on the three non-economic 40 CFR § 131(g) factors cited by IEPA.

II. Evidence in the Record Supports the Upper Dresden Island Pool Aquatic Life Use

As mentioned previously, IEPA has not attempted to meet the burden of showing that a sub-fishable use should be designated for the UDP. This is a sound decision. It is generally agreed that QHEI scores above 60 indicate that the water body can support general aquatic uses

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5/5(c), 5/11(a)(5), (7), (b), the Illinois "economic reasonableness" test, 415 ILCS 5/27 (2007), should be interpreted by the Board to be consistent with federal law. An Illinois use designation, then, is economically reasonable if it does not create adverse "widespread economic and social impact." The CWA and the obligations it imposes on delegated states, do not allow for higher recreational use designations to be rejected based on considerations of cost and economic impact that does not quality under Factor 6. See Interim Economic Guidance for Water Quality Standards, Workbook, Appendix M to the Water Quality Standards Handbook - Second Ed. (EPA-823-B-94-005a), EPA-823-B-95-002 (Mar. 1995), IEPA SOR, Att. C ("USEPA Factor 6 Guidance"), p. 1-5.

and the Brandon Road Tailwater portion of the UDP scores above that according to multiple analyses. Rankin Report, Petition Attachment R; QHEI score summary for Upper Dresden Island Pool Ex. 32. Given, as discussed above, that the fish do not have to be able to breed everywhere in the pool to be present, the fact that there is some excellent habitat in the UDP itself more or less settles the question. Thomas, 8/14/09A, Tr. 67-68, 73. Indeed, the aquatic vegetation beds in the UDP make the habitat better than that available in many of the other rivers in Illinois. *Id.* at Tr. 15, 24, 30-31, 116. 118. Moreover, there is potential back-water habitat available in streams and rivers waters connected to the UDP, including the riffle habitat several experts emphasized as necessary for several species to breed. *Id.* at 38; Barghusen, 10/5/09 Tr. 115.

The fishery, although affected now by water quality issues, already largely meets full "fishable" uses. Even in 1995, Dr. Allen Burton, then a contractor for the Commonwealth Edison Company, was able to report that, despite sediment contamination, "the Brandon Road tailwaters possess highly desirable fish habitat and fish populations." (Ex. 372 p. 10). The modified Index of Well Being favored by Midwest Generation ("MWG") consultants EA Engineering Science and Technology shows that most of the UDP that is now designated indigenous life use above the I-55 Bridge scores as well or better than much of the UDP that is currently designated general use. Ex. 368. Sampling by IDNR below the Brandon Road Lock in 2008 showed "that the system is improving, with shorthead redhorse, smallmouth bass, buffalo and other fishes that need higher quality water present." PC 182. Dr. Thomas testified that the UDP already has an assemblage of fish that indicates the potential to meet the general use goals, and that water quality improvements could lead to many more species (including important sport species) being there, or being there in greater number. Thomas, 8/14/09, Tr. 63, 98, 114. The places where the UDP has the lowest quality of fishery is in the Joliet plant discharge channel and directly below the MWG discharge. EA Project 61393.26, Development of Biologically Based Thermal Limits for the Lower Des Plaines (August 2007) Ex. 368, Figure 1; Seegert, 9/9/09P, Tr. 40, 44.

There has been testimony that contaminated sediment is present in the UDP pool, and that it may be having some effect on the aquatic community. There does not appear, however, to be any reason to believe that these sediments render the UDP incapable of meeting general use goals. Generally, while no one favors having toxic sediments, it has been observed that very good fisheries can occur in areas of poor sediment. Thomas, 8/14/09, Tr. 129, 139. As mentioned above, there are healthy fish populations in the Brandon Tailwaters of the UDP despite some heavily contaminated sediment. It is also of interest here that sediment quality also does not make a clear difference in the fishery in the CAWS. Bell, 3/10/ 2011, Tr. 163.

Finally, as discussed above, even if there were a basis for finding the UDP to be incapable of meeting fishable standards, there would be good reasons for setting fishable uses as a goal for the water body. Drawing the division between the “general use” and “indigenous aquatic life” designations at the I-55 bridge has always been suspect, as there is nothing to keep fish from swimming under the bridge to encounter whatever poor water quality is present there. More generally, it is ecologically unwise to try to treat water body segments not separated by a dam or other barrier as though they were somehow distinct ecological systems. As stated by Ms. Barghusen and by numerous reports written by IDNR, the UDP is critical for connection between the DuPage River, the Kankakee River, Jackson Creek, Hickory Creek and other water bodies. 10/5/09 at 81-83, 85-87, 92-93, 104-106, 121-124. “[E]ven if a species … might not live in a small creek for its entire life, you still may have juveniles using that creek as a nursery ground…. The way fish colonize in these tributaries is through the river to which they connect." *Id.* at Barghusen, 10/5/09, Tr. 124. Taking a slightly broader view of the tributaries that have unobstructed connections to the Upper Dresden Island Pool reveals very rich species assemblages that could move into the Upper Dresden Island Pool if water quality were improved. For example, the DuPage River flows into the Des Plaines just below the I-55 bridge, and the fish sampling station (GB-01) on the DuPage closest to the confluence with the Des Plaines and below the Channahon Dam, has 38 fish species and an IBI of 57 out of a possible score of 60. The fish collection at this site included River Redhorse, a state Threatened species (Status of Fish Communities and Stream Quality in the Des Plaines and DuPage Rivers: 2003 Basin Survey) (Ex. 340). This site was resurveyed in 2008 with similar results.[4] This is an incredibly rich site and there are no physical barriers between it and the Upper Dresden Island Pool and nothing to prevent species from moving between the lower DuPage and the Upper Dresden Island Pool if water quality improves.

III. Evidence Regarding Attainability in a Number of the Segments of the CAWS and the Brandon Pool of the Des Plaines Does Not Support Setting a Sub-Fishable Aquatic Life Use

IEPA has cited three of the 40 CFR § 131(g) factors as supporting a less-than-"fishable" designation for parts of the CAWS and the small portion of the LDPR above the Brandon Road Lock and Dam:

[4] Status of Fish Communities and Stream Quality in the Des Plaines and DuPage Rivers: 1997-2008, by Stephen M. Pescitelli and Robert C. Rung, Illinois Department of Natural Resources, Office of Resource Conservation Division of Fisheries, September 2010, attached as Exhibit 2.

> 131(g)(3) - Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place;
>
> 131(g)(4)- Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use; or
>
> 131(g)(5) - Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses.

Based on the data that it had in 2007 and its application of these factors, IEPA then proposes Aquatic Life Use 'A' designations for the NSC, the North Branch of the Chicago River above Goose Island, the Middle Calumet River, the Lower Calumet River, Lake Calumet, the Little Calumet River and the Cal Sag Channel. UAA Factor Applications to CAWS and Lower Des Plaines River, Ex. 29. IEPA proposes a designation of "Aquatic Life Use B" for the North Branch below Goose Island (the "Lower NBr"), the Chicago River, the South Branch of the Chicago River, the Sanitary and Ship Canal, the portion of the Calumet River between O'Brien Locks and Lake Michigan (the "Upper CalR"), the Lake Calumet Connecting Channel and the small portion of the Lower Des Plaines between Brandon Road Lock and Dam and the Sanitary and Ship Canal. (the "LDPRBrand"). *Id*.

For the reasons set forth in the sections below, IEPA is correct that the waters that it seeks to designate as "Aquatic Life Use A" are entitled to at least that high a designation. Indeed, the evidence does not support downgrading the waters that are currently designated General Use.

On the other hand, the record does not contain facts necessary to meet the burden of showing that any § 131.10(g) factor allows designating the Brandon Pool of the Des Plaines River, any Branch of the Chicago River, or any part of the Calumet River or the Lake Calumet

Connecting Channel for uses less than "Aquatic Life Use A."[5] The effort to show the applicability of the three § 131(g) factors cited in this case in large part failed to take into account the mobility of adult fish, which allows them to use habitat anywhere within a waterbody or set of connected water bodies, not just the particular segments focused on by certain witnesses. It additionally failed to take into account the possibility of creating suitable habitat. As stated in a letter by USEPA, "UAAs are meant to assess what is attainable, it is not simply about documenting current water quality conditions." Letter of E. King, 3/13/06 (Ex. 11)

Water body segments directly connected to Lake Michigan

Admittedly, the Main Branch of the Chicago River and the Calumet River between the O'Brien Lock and Lake Michigan do not generally have good habitat, but those waters are directly connected to Lake Michigan. They are now designated as general use because water quality is very high, as they contain basically Lake Michigan water. Further, MWRD consultant Scott Bell testified that sediment quality is generally better in the segments closest to Lake Michigan. Bell, 5/16/11, Tr. 29, 47.

The Calumet River is hydrologically connected to Lake Michigan. There is no control structure on this northern portion of the Calumet River. Pre-filed Testimony of Jennifer Wasik, Ex 461 at 6**.** As a result, the Calumet River and Lake Calumet act as a surge basin for Lake Michigan during wind-driven fluctuations in Lake Michigan levels. IEPA Proposal at 30. Fish

[5] As stated above, the Environmental Groups agree that the South Fork of the South Branch ("Bubbly Creek" should be addressed in a separate subdocket. The Environmental Groups agree that the Sanitary and Ship Canal may properly be designated as "Aquatic Life Use B" at this time because, unlike other portions of the CAWS, it does not have good habitat, there are no practicable plans for habitat improvement in the near future, the fish barrier is there specifically to limit fish movement and the CSSC is not directly connected to areas suitable for fish reproduction.

species uncommon to the rest of CAWS are found in the northern portion of the Calumet River. Wasik Ex. 461, at 6.

The southern portion of the Calumet River is unique in the CAWS in the quality of its habitat. In her pre-filed testimony, MWRD biologist Jennifer Wasik characterizes the southern portion of the Calumet River in the following manner:

> The Calumet River, south of 130th Street to the O'Brien Lock and Dam, has a substantial continuous reach which contains physical habitat attributes that are either absent or found in isolated pockets in the rest of the CAWS. A side channel shallow (approximately 3 feet depth) area with relatively abundant fixed aquatic vegetation is present where the channel widens. A gradually sloping bank with emergent vegetation is present in this reach of the Calumet River to an extent not found in other areas of the CAWS. *Id.*

The Calumets are also unique in the CAWS because they include a connected inland lake, Lake Calumet, which exhibits several shallow areas, instream cover consisting of woody debris and extensive overhanging vegetation near the shoreline. *Id.*

The Lake Calumet connecting pool is directly connected to high quality waters, and Lake Calumet has the potential to act as off-channel habitat with shallows for the Calumet River. The connection it has to Lake Michigan through the Calumet River means it is well situated to offer refugia and spawning grounds to fish moving between Lake Michigan and the Calumet system. A notable example that lake fish do travel into the Calumet system from Lake Michigan and into Calumet's lakes was reported in the Chicago Sun Times on November 29, 2011 in the article "Sturgeon Find Operating Room" which references a lake sturgeon caught on the Illinois side of Wolf Lake in Calumet in February 2000.[6] This sturgeon bore a tag from the Wolf River in Wisconsin from 1994, and could have travelled to Green Bay and into Lake Michigan and then worked its way through the Calumet canal system. This article also references a lake sturgeon

[6] *Available at* http://www.suntimes.com/sports/outdoors/9141228-452/sturgeons-find-operating-room.html and attached as Exhibit 3.

found in a water pipe off Chicago in fall 2011 and the sturgeon restocking efforts currently taking place as a cooperative effort of the four Great Lakes states, tribal bands and the federal government. The restocking efforts have the potential to double or triple the sturgeon population in Lake Michigan and development and maintenance of habitat, including spawning habitat, on connecting rivers will help insure the sustained existence of the population. The opportunity is stronger today than it has been in past decades to repopulate Lake Michigan tributary systems with sturgeon because of the large investment in restoring headwater wetlands (*e.g.*, the Army Corps investment in Wolf Lake in the past several years to create better fish spawning habitat, and the proposed transfer of Lake Calumet to a natural resource agency such as the Cook County Forest Preserve District or the Illinois Department of Natural Resources). In addition, Wolf Lake in Calumet is recognized as a biologically rich river, which could act as a center from which aquatic life could radiate in a restored Calumet system. In order to help realize the potential for habitat for fish species as they travel through the Calumet system it is essential to protect water quality in the channel connecting the Calumet River to Lake Calumet.

The Calumets

There is a dominant fish community that occurs throughout the Calumets. This population includes species representing multiple trophic levels, an abundant and diverse prey base, and predator-prey relationships commonly observed in natural waterways within the region. January 14, 2010 Memo from LimnoTech to Metropolitan Water Reclamation District, p. 7, attached to Pre-Filed Testimony of Scott B. Bell, Ex. 447. The ubiquity of the dominant community suggests that the Calumets - like the CAWS generally - are supporting a structurally complete and regionally appropriate fish community under the existing unmanaged conditions. *Id*. at 8. This dominant community is characterized by largemouth bass as the top carnivore, with common carp, bluegill, gizzard shad, green sunfish and pumpkinseed as common planktovores/benthivores. Ex. 459. Common herbivores/detritivores are the spotfin shiner, golden shiner, emerald shiner and bluntnose minnow. *Id*.

In the Calumets, where there is water exchange with Lake Michigan, the rock bass/smallmouth group is abundant in the Calumet and Little Calumet Rivers in the vicinity of the O'Brien Lock and Controlling Works. January 14, 2010 Memo from LimnoTech to Metropolitan Water Reclamation District, p. 7, attached to Pre-Filed Testimony of Scott B. Bell, Ex. 447. Further inland, there is a white perch/yellow bass cluster that is most prevalent in the Cal-Sag Channel and the Little Calumet River. *Id*.

However, even these characterizations of aquatic life (all of which are derived from MWRD's own experts) significantly underestimate the diversity and quality of fish species that have been identified in the Calumets. In May, 2010, a fish sampling event was conducted on the Little Calumet River downstream of the O'Brien Lock and Dam. Ex. 505, p. 1. This event included the application of the fish toxicant, Rotenone, resulting in more detailed observations of resident fish than observations obtained through the use of conventional electro-fishing and netting collection gear. *Id*. The Illinois Department of Natural Resources ("IDNR") was surprised by "the observed richness and abundance of existing fish community". *Id.* IDNR noted this was "unexpected given the historical information and poor habitat rating (QHEI range 27-49)" as described in the IL EPA's UAA Final Report that was part of its original filing in IPCB Case No. R08-9. *Id.*

A total of 38 species were recovered from the Little Calumet River Rotenone event in May, 2010, significantly in excess of the 29 total species cumulatively assembled in electro-fishing events conducted from 1997 to 2002. *Id*. at 2. Even four electro-fishing events conducted at the same place during the same time period as the Rotenone event only recovered 27 species. *Id*. IDNR characterized the results of the Rotenone event as follows:

> A total of 13 species were found in the May, 2010 Rotenone operations were not found in the May 2010 electro-fishing samples. A total of 10 species were found in the Rotenone sampling operation and were not recorded in the Use Attainability Analysis report (CDM 2007). Among the species unique to the Rotenone sampling event were flathead catfish, black buffalo and smallmouth buffalo. Ghost shiners were also very common in the Rotenone sample but have not been recorded for any other area of the CAWS. *Id*.

IDNR further observed that game fish were common in the Little Calumet River, comprising 13 of the 38 total recovered species, with channel catfish and rock bass as the two most abundant species. *Id.* at 3; *see also* Exhibit 446. Although tolerant species were numerous, they comprised only 9 of the total species recorded. *Id*. The less tolerant species included the smallmouth bass, which IDNR characterized as intolerant. *Id*. at 4. Notably, IDNR's conclusion about the prevalence of smallmouth bass in the Little Calumet is consistent with the pre-filed testimony of MWRD biologist Jennifer Wasik, who noted the greatest occurrence of smallmouth bass in the CAWS is observed in the Calumet River. Wasik Pre-filed testimony at 5. Ex. 461. IDNR stressed the good body condition observed for most individual fish species, a finding that it asserts is inconsistent with poor water or sediment quality. *Id*. at 3. IDNR concluded its public comment by reaffirming its support for the IL EPA revisions to water uses and standards. *Id*. at 4.

The evidence now before the IPCB demonstrates that the Calumets support a well-structured and regionally appropriate dominant fish community. Even more compellingly, there is new evidence of greater diversity. This suggests the aquatic life potential of the Calumets – evidenced by actual fish species present, including less tolerant species – is significant and must be protected as part of developing new water standards.

Moreover, an even greater aquatic life potential of the Calumets will be realized in the next few years. By 2015, regional TARP will be completed when the existing TARP infrastructure is connected to the vast Thornton Quarry reservoir. This will virtually eliminate combined sewer overflows in the Calumets. Tr. 09/08/08 a.m. at 76. The Calumet Wastewater Treatment Plant will disinfect its wastewater by 2016. In addition, as David Zenz testified on May 18, 2011, the Calumets already include a system of MWRDGC-operated side-stream elevated pooled aeration ("SEPA") stations specifically designed to oxygenate the water if DO levels are depressed, typically due to combined sewer overflow events. These stations are designed to operate continuously if necessary. *Id*. The SEPA stations preserve aquatic life in the Calumets in two ways. First, they increase the levels of oxygen in the ambient water. Second, they serve as a refuge for fish during periods of low DO. Tr. 5/17/11 at 74-76 (Wasik). IL EPA does not anticipate that additional SEPA stations are required in the Calumets to meet its proposed DO standards. IL EPA proposal p. 100.

Because of the existing aeration stations and near term implementation of regional TARP and wastewater disinfection, the Aquatic Life Use A proposal put forward by the Environmental Organizations and MWRDGC for the Calumets is not speculative, costly nor technically infeasible. IL EPA does not object to this proposal. Although some participants in this rulemaking expressed concerns about the MWRDGC-Environmental Organization proposal, none of these objections were directed toward the enhanced use classifications for the Calumets

The North Branch below Goose Island

The North Branch of the Chicago River below Goose Island is, of course, directly connected to the North Branch above Goose Island. The North Branch of the Chicago River above Goose Island also has a relatively high QHEI score (IEPA Proposal Attachment R), and habitat could be improved by 18%, (Limnotech Habitat Improvement Report (PC 284) at 57). Also, the potential habitat for certain life stages of fish that could live in the CAWS section of the North Branch would be improved further by better connecting the Upper North Branch, which is still largely a natural channel and designated as "general use," with the CAWS. Indeed, there are proposals that have been placed in the record for doing just that. Pre-filed Testimony of Kimberly Rice Ex. 475. Moreover, habitat projects have been proposed for the North Branch adjacent to Goose Island in the North Branch Channel that would improve the habitat substantially. *See* O'Hare Modernization Program Wetland Mitigation Options (Ex. 462) and the pre-filed testimony of Paul Botts. (Ex. 473).

Additional habitat improvements are likely to flow from the developing vision of the next recreational frontier on the river and separation concepts designed to physically separate the Great Lakes from the Mississippi River basin.[7] This involves a direct, open connection to Lake Michigan. For that to become a reality, dramatic improvements in water quality are necessary to

[7] Great Lakes Commission – Great Lakes and St. Lawrence Cities Initiative, Restoring the Natural Divide: Separating the Great Lakes and Mississippi River Basins in the Chicago Area Waterway System. Accessed Feb. 20, 2012. http://www.glc.org/caws/

meet the goals of the CWA and thereby meet the more stringent Great Lakes water quality standard. Indeed, U.S. EPA noted '[t]he State of Illinois is long overdue on updating its water quality standards to provide the CWA protections[8]…". As a result, water flows to Lake Michigan will require upgrades to North Side wastewater treatment plants (WWTP), including the removal of nutrients such as phosphorus.

The South Branch of the Chicago River

The South Branch is also part of the connected system that is formed by the North Branch and the Chicago River and habitat improvement projects have been projected for the South Branch. Even limited to considering fairly small improvements to the South Branch, the Limnotech study found that the South Branch could be improved substantially and that habitat improvement on the South Branch could result in a 38% change in its CAWS Habitat Index, making it the reach with the greatest potential for positive change presented in the study. (PC #284 p. 57) In its discussion of the habitat improvement potential of the South Branch, LimnoTech includes removal of vertical walled banks. The LimnoTech study also presents Habitat Improvement Technique Fact Sheets in Appendix B, including techniques for the creation of linear shallows along canals. Created shallows provide benefits such as shallow refugia for fish, spawning, and/or nesting habitat for multiple species, herptile habitat, habitat for rooted aquatic and emergent macrophytes and physical habitat for low energy plants and animals. Projects such as creation of linear shallows along the South Branch in conjunction with removal or modification of vertical walls could diversify available habitat considerably. Still more substantial projects on or near the South Branch have been proposed by the Wetlands

[8] Letter from Nancy K. Stoner, Acting Assistant Administrator, U.S. EPA, to Lisa Bonnett, Interim Director, Illinois EPA. 2011. Accessed Feb. 21, 2012. http://www.epa.gov/Region5/chicagoriver/pdfs/caws-determination-letter-20110511.pdf.

Initiative. O'Hare Modernization Program Wetland Mitigation Options (Ex. 462) and the pre-filed testimony of Paul Botts (Ex. 473).

Similarly, the hydrologic separation concept discussed previously between the Great Lakes and Mississippi River basins will provide additional habitat improvement along the South Branch, north of Bubby Creek, with added recreational opportunities like fishing. Additional flow augmentation will prevent stagnant water on either side of the barriers.[9] In doing so, fish habitat will dramatically increase, providing optimal conditions for Aquatic Life Use A designation.

The Brandon Pool

The QHEI score of the Brandon Pool in the area near the confluence of the Des Plaines and the Chicago Sanitary and Ship Canal (RM 290.1) is well into the "good" range 68.5 (Exs. 5 and 6) although the habitat is predictably poor immediately above the dam. However, independent biological data now show that this reach of the Des Plaines is capable of providing habitat for juvenile fish that should be protected with an 'A' classification.

Much of the information on aquatic life that has been available in this proceeding has come from electro-fishing data. While these data are certainly useful, they have serious limitations. Electro-fishing is less effective for small fish and basically cannot be used for larval fish. Seegert, 11/10/09, Tr. 15-16. Depending on the type of equipment used, electro-fishing may

[9] Great Lakes Commission – Great Lakes and St. Lawrence Cities Initiative, Restoring the Natural Divide: Separating the Great Lakes and Mississippi River Basins in the Chicago Area Waterway System. Accessed Feb. 20, 2012. http://www.glc.org/caws/

be effective to depths of four feet, six feet or thirteen feet. *See* Seegert 11/10/09, Tr. 15. Also, when MWRD utilizes electro-fishing, it fishes at shallower areas of a particular reach. Bell, 3/10/11, Tr. 65. It is clear, then, that much of our data are biased against finding fish that are very small, or are below thirteen feet.

The discovery of DNA from Asian carp above the electro-barrier located in the Sanitary and Ship Canal is deeply problematic, but it did result in collection of useful data as to the fish present in the CAWS. IDNR detailed the new information derived from observations and data collected during two Asian carp monitoring and control activities, which occurred in the Chicago Sanitary and Ship Canal in December 2009 and in the Little Calumet River near O'Brien Lock and Dam in May 2010. These collections found both a larger range of fish than had been anticipated but also found that the fish were largely free of "DELT [deformities, erosions, lesions and tumors] and the general body condition was very good to excellent." PC 505 at 3. The comment states:

> Both the [CSSC and Little Calumet] operations resulted in more detailed observations of resident fish assemblages that the observations obtained through the use of conventional electro-fishing and netting gear. Although conventional gears, such as electro-fishing, can be effective in sampling native fish communities, such collection gear has limitations for sampling in large deep draft channels, and especially areas with steep, artificial banks.
>
> ....
>
> The December 2009 and May 2010 sampling demonstrated that the CSSC is capable of supporting a diverse, healthy and reproducing population of fish comprised of a high percentage of moderately tolerant species in adult and early life stages. The Little Calumet River was also found to support a diverse assemblage of species including the intolerant smallmouth bass (N=45). IDNR observed evidence of reproduction, which would be necessary to maintain the moderate standing stocked estimated for the segment of the Little

> Calumet River below the O'Brien Lock. This area also supports diverse and reasonably abundant sportfish populations.
>
> ……..
>
> IDNR observations and data suggest that the currently proposed 'Aquatic Life Use B' for the Lower CSSC and Brandon Pool could be upgraded to "Aquatic life Use A." Additionally, when viewed in the context of the habitat indices contained in this rulemaking record, IDNR observations and data from the Rotenone samplings suggest that other proposed 'Aquatic Life B' waters in the CAWS, with similar or better habitat, may currently be supporting a higher aquatic life use than the "Use B" category, as defined. *Id.* at 1, 4.

Based on these data that were not available at the time the IEPA petition was filed in 2007, it is clear that Brandon Pool must be protected for fish reproduction as an existing use. Moreover, it suggests broadly that conclusions regarding all of the sections of the CAWS and the UDP that are based on a poor assemblages of fish collected through electro-fishing must be taken with more than a grain of salt.

IV. The Asian Carp in the LDPR and the Potential for Asian Carp in the CAWS Should Have No Bearing on the Decision Regarding Use Designation

Asian carp have been in the Illinois River since at least the late 1990s, but in 2010 certain parties (which had not raised the carp issue as relevant to any phase of this proceeding since hearings began in 2008) presented days of testimony regarding the potential impact of Asian carp on the attainable uses for the UDP and the CAWS. Although some interesting information on Asian carp and its progress up the Mississippi River was presented, the only testimony regarding Asian carp that was actually relevant to this proceeding consisted of unsupportable conclusions and speculation.

However, the presence of invasive species in a system is no reason to adopt use designation goals that allow weaker water quality criteria. As stated by Dr. Thomas in his December 16, 2010, Public Comment:

> A large percentage of our water bodies in the United States now have invasive species and many water bodies have multiple invasive species. There has been an estimate made that in the Great Lakes at least one new invasive species a year gets established in the lakes. If the presence of invasive species meant that a water body would no longer meet the Clean Water Act goals, then we will have few water bodies that can meet these goals. Rather what may be required is that we work to further improve our water quality in our water bodies to give native species every chance to compete against invasive species. PC 560.

CONCLUSION

For the above reasons, the Environmental Groups support that portion of the IEPA proposals which proposes updating aquatic use designations to reflect the current status of existing and attainable aquatic life uses on the CAWS and UDP. The Environmental Groups do not support the IEPA proposal to downgrade the northern section of the NSC, the Calumet River or the Main Branch of the Chicago River. Further, the record does not support designations lower than ‘A’ for the Brandon Pool, the Lake Calumet Connecting Channel, the South Branch of the Chicago River or any part of the North Branch.

Dated: March 5, 2012

Respectfully submitted,

ENVIRONMENTAL LAW & POLICY CENTER

FRIENDS OF THE CHICAGO RIVER

NATURAL RESOURCES DEFENSE COUNCIL

OPENLANDS

ALLIANCE FOR THE GREAT LAKES

PRAIRIE RIVERS NETWORK

SIERRA CLUB - ILLINOIS CHAPTER

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Authorized to represent the parties listed above for the purposes of these post-hearing comments

EXHIBIT 1

Priority Number: 1

Project Name: Cal-Sag Channel Millennium Reserve Project

Project Type: Artificial seaweed, linear shallows, sunken structure

Applicable water stretch/location: On the Cal-Sag Channel downstream of confluence with Little Calumet River, between Route 57 and Division Street. This is an approximately 2,250 ft. stretch. Improvements would be interspersed throughout. Amount that could be improved would depend on how much funding could be leveraged in addition to District contribution, through Millenium Reserve Project. Land adjacent to waterway is owned by District and currently appears to be vacant. Exact location subject to site visit and evaluation.

Purpose: Sediment stabilization and consolidation, dissipation of wave/wake energy, and improve aquatic habitat for fish and invertebrates on both sides of the waterway

Targeted Result/benefit (aquatic life use goals): Refuge and shallow water zones for fish shelter, foster more complete food web, encourage aquatic emergent and submergent vegetation, potentially install small cavity structures targeting catfish spawning.

Details

Basic elements of project: Sunken structure achieved by one or a combination of the following: 1) Enlarging existing cavities and reinforcing/stabilizing with underwater grout, 2) creating additional cavities into the bank material while maintaining structural integrity of the wall, creating riprap aprons to elevate structures above the silty sediments and amend them with artificial fish habitat such as those found on www.fishiding.com, or 3) Apply concrete box culverts or pipes on top of riprap aprons to create cavity structures along steepest/deepest sections. These may provide spawning habitat for catfish.

Install 200’ stretches of artificial seaweed applied set back from navigational activity and 50’ from the bank waterline to provide protected area behind seaweed.

Construct at least one 100’ stretch of linear shallow in widest area of the channel with artificial seaweed at entrance to dissipate wave energy.

Signage and buoys will need to mark the enhancements to warn barge traffic.

Citation to prior proposal: Page 7 of the LimnoTech Habitat Improvement Report Appendix C, Sample Site 59, outlines a project plan for an area further west along the Cal-Sag Channel (at Cicero Ave) than is suggested in this proposal. However, this was consulted for some of the suggested enhancement elements. Also, for Millenium Reserve details, see http://www2.illinois.gov/gov/millennium-reserve/Pages/vision.aspx

Challenges: High navigational traffic in this stretch will necessitate measures to avoid encroaching and collision. Design will have to be resistant to barge wake energy and fluctuating water levels. Must be significant extra width from navigational traffic area to provide 15-40' habitat zones. Sediment loads may silt in the shallow areas which may require periodic removal maintenance. Need to ensure floatables do not block entrance to linear shallows areas. Artifical seaweed would probably require concrete mattress which necessitates crane barges to bring heavy loads to the site.

Estimated Cost Range: $350,000 - >$500,000, depending on extent of improvements.

Feasible timeline: Preliminary design, final design and construction, RFP process, potential grant application, interagency agreement execution - 2-1/2 to 3 years

Electronic Filing - Received, Clerk's Office, 03/05/2012
* * * * * PC # 1283 * * * * *

Priority Number: 2

Project Name: North Shore Channel Wetlands

Project Type: Created wetlands on the banks of the Northshore Channel with local volunteers helping with wetland installation and maintenance. This could serve as a demonstration project of what could be done in other areas where local volunteers are available.

Subject to site visit and evaluation. Potentially at the Oakton Street rowing center, North Side College Prep high school or the Evanston Ecology Center, all of which may be able to provide local volunteers.

Purpose: Provide off channel habitat and refuge for aquatic life, filter run off entering the channel, improve visual condition of the area, act as a demonstration project, involve local volunteers in the improvement of the channel.

Targeted Result/benefit (aquatic life use goals): Provide off channel habitat for fish for refuge.

Details

Basic elements of project

Create a wetland or wetlands along the channel, direct outfalls and runoff through them, include emergent vegetation. Create needed off-channel refuge areas for aquatic life and involve local volunteers in the project both during the installation phase and the follow up maintenance. This project could also include creation of off channel refuge areas by creating vegetated revetments along the shore including macrophytes. Involve the rowing center, Northside College Prep (which has extensive gardens) or the Evanson Ecology Center in maintaining the wetland/revetment plantings over time. Introduce oxygen to the water through macrophytes and possibly design revetments so water would swirl around them to oxygenate the water.

Citation to prior proposal if one exists: NA

Challenges: Success will depend on a dedicated corps of volunteers who will actively maintain the plantings into the future. Landowners would need to be agreeable to the project.

Estimated Cost Range: approximately $200,000 depending on linear feet improved and the methods used.

Feasible timeline: Preliminary design, final design and construction, potential grant application – 1 and half years

Priority Number: 3

Project Name: Downtown Habitat Hotspots

Project Type: Utilizing spaces along river-edge structures such as seawalls and dolphins to implement created habitat. Linear crib habitat can be installed along the seawall to provide cover and refuge for fish and other aquatic life. Cribs can be attached to a sea wall, dock, or walkway (similar to the cribs used along the Milwaukee River). Fish hotels and dolphin gardens can be used to create habitat in areas along the main channel that will not impact the boating lanes.

Purpose: Increase available structural habitat for fish and other aquatic life to provide adequate habit to support a healthy native fish population.

Targeted Result/benefit (aquatic life use goals): Increase the availability of habitat for fish and other aquatic life along the constructed river edge, while also creating demonstration projects.

Details

Basic elements of project

- Assessing main stem to identify project location
- Anchoring multi-level, constructed cribs to seawall/riverwalk
- Constructing and installing fish hotel/dolphin gardens
- Creating outreach campaign

Citation to prior proposal if one exists: NA

Challenges:

- Impact on boating channel
- Maintenance/Ownership
- Overwinter storage?

Estimated Cost Range: approximately $150,000 - $200,000 depending on footprint of project

Feasible timeline:

- Design and permitting – 6-9 months
- Construction and installation – 3-6 months (seasonal)

Priority Number: 4

Project Name: North Branch Canal Improvement Project

Project Type: Aesthetic improvements, shoreline habitat enhancements like floating vegetation or vegetated revetments, or consider vegetated hanging baskets with root system underwater depending on water level fluctuation. Include waterway educational signage if in an area with small boat traffic to explain importance of physical habitat to aquatic life. More in depth/expensive project could involve wetlands on a portion of the canal if additional funding could be leveraged.

Applicable water stretch/location

Subject to site visit and evaluation, land ownership. Potentially at southern end of North Branch Canal for most visibility. Mid-section south of Division Street has more "riparian zone" vegetated open land lining the canal already- may need to focus in that area.

Purpose: Provide cover, shade, and refuge for fish and other aquatic life and to improve visual condition of the area

Targeted Result/benefit (aquatic life use goals): Floating vegetation geofabric will promote biological filtration, aeration, and habitat in the underwater root zones. In-stream vegetation of any kind will contribute to shading/cover for fish.

Details

Basic elements of project

On southern end of North Branch Canal, install either floating vegetation/revetments if possible or consider vegetated hanging baskets on the channel wall in approximately 20' lengths at various increments.

Citation to prior proposal if one exists: NA. The Wetlands Initiative had a proposal in 2003 to turn the entire canal into a wetland leaving a path for rowers, but this is a much more elaborate project than proposed here. As cost estimate was not done for that project.

Challenges: Navigational traffic and mooring, water level fluctuation (if floating vegetation or vegetated baskets are considered), industrial land users, vegetation predation by birds,

Estimated Cost Range: approximately $250,000

Feasible timeline: Preliminary design, final design and construction, RFP process, potential grant application – 2 years

Priority Number: 5?

Project Name: South Branch Chicago River Canal Improvement Project

Project Type: Overhanging vegetation, bank pocket areas, or consider bank modifications to create a shallow zone along the bank/wall. Include interpretive signage if the project is visible from Ping Tom Park. This could serve as a demonstration project of what could be done in other areas where the sea walls are not in good shape and where invasive vegetation along the bank could be removed and replaced with native overhanging vegetation.

Subject to site visit and evaluation, land ownership. Potentially across the river from Ping Tom Park where invasive vegetation and rotting wood pilings currently exist along an approximately 300 foot stretch.

Purpose: Provide cover, shade, and structural refuge for fish and other aquatic life, improve visual condition of the area and act as a demonstration project.

Targeted Result/benefit (aquatic life use goals): Provide structural habitat for fish such as spawning and nesting habitat, create shallows, provide overhanging vegetation for shading/cover for fish.

Details

Basic elements of project

Removal of invasive vegetation and planting of native vegetation that would overhang. Removal of degraded pilings and, if possible, cutting a “shelf” that is at least a few feet deep on the bank to create shallows and installing pilings at the back of this “shelf” for stabilization or stabilizing the back in some other way such as sloping it and planning it, as site conditions allow. Either real vegetation or artificial seaweed could be installed on the shelf to provide structure (in the case of artificial seaweed), habitat and feeding opportunities. If site conditions on available sites do not allow for the cutting of a shelf, consider replacing degraded pilings with lunkers to create pocket habitat for fish or sloping the bank behind the wood pilings, stabilizing it with vegetation and then removing the pilings.

Citation to prior proposal if one exists: NA

Challenges: Design will have to be resistant to barge wake energy and fluctuating water levels, area available for shelf cutting or sloping and/plantings behind currently existing pilings would need to be wide enough to accommodate the project, sediment loads may silt in the shallow areas and may require periodic removal maintenance. Landowners would need to be agreeable to the project.

Estimated Cost Range: approximately $200,000-500,000 depending on linear feet improved and whether a shelf, slope or lunkers are installed.

Feasible timeline: Preliminary design, final design and construction, RFP process, potential grant application – 2 years

Priority Number: 6?

Project Name: Cal-Sag Channel near CSSC confluence

Project Type: Artificial seaweed, linear shallows, chamber revetments.

Applicable water stretch/location

330 linear feet upstream of the confluence with the Chicago Sanitary and Ship Canal and SEPA 5, east of Route 83 bridge, in vicinity of Saganashkee Slough.

Purpose: Sediment stabilization and consolidation, dissipation of wave/wake energy, refugia for aquatic life including fish of various life stages

Targeted Result/benefit (aquatic life use goals): Refuge and shallow water zones for fish shelter, foster more complete food web, encourage aquatic emergent and submergent vegetation.

Details

Basic elements of project: Artificial seaweed mats along south bank would be installed throughout the project reach. 200' of 3-8' linear shallows would be excavated on the north bank adjacent to Saganashkee Slough. On either side of the linear shallows, chamber revetments with rock encased in wire mesh would be affixed to the channel walls to form overhanging bank (100 linear feet and 18" depth). Signage and buoys will need to mark the enhancements to warn barge traffic.

Citation to prior proposal: Page 2 of the LimnoTech Habitat Improvement Report Appendix C, Sample Site 43, outlines a project plan for this stretch, which was the basis for this proposal.

Challenges: High navigational traffic in this stretch will necessitate measures to avoid encroaching and collision. Design will have to be resistant to barge wake energy and fluctuating water levels.

Estimated Cost Range: $250,000-$325,000

Feasible timeline: Preliminary design, final design and construction, RFP process – 2 years

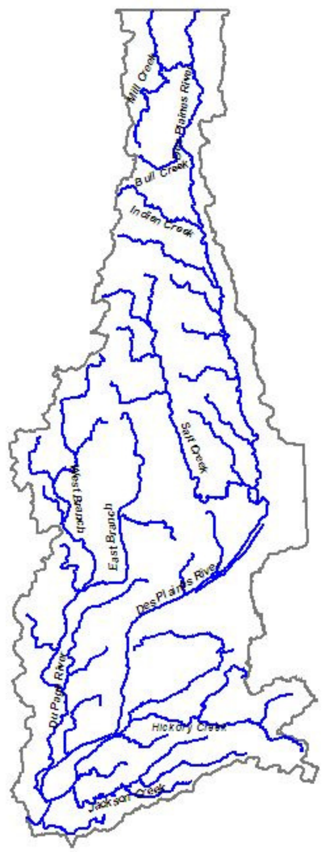
Electronic Filing - Received, Clerk's Office, 03/05/2012
** * * * * PC # 1283 * * * * **

EXHIBIT 2

Office of
Resource Conservation
Division of Fisheries

Region II
Streams Office
5931 Fox River Drive
Plano, IL 60548

Status of Fish Communities and Stream Quality in the Des Plaines and DuPage Rivers: 1997-2008



September 2010

Stephen M. Pescitelli and Robert C. Rung

Executive Summary

The Des Plaines and DuPage River watersheds were surveyed in 2008 by the Illinois Department of Natural Resources and the Illinois Environmental Protection Agency as part of a statewide monitoring program to measure the health of Illinois streams. This report summarizes results of the fish surveys including: species composition, species distribution, and determination of stream quality based on the Index of Biotic Integrity, as well as information on the sport fishery. Results from the 2008 survey were compared to previous surveys of Des Plaines/DuPage River Basin conducted in 1997 and 2003. Water quality and other results from the 2008 survey will be published separately in the IEPA 305(b) Water Quality Report (IEPA in prep.)

For all 30 stations sampled in 2008, we collected 10,758 fish representing 15 families, 70 species. Five non-native species were collected including, Asian weatherfish, common carp, goldfish, grass carp, and round goby. One grass carp was collected below the Brandon Lock and Dam and no other Asian carp species were collected or observed. No State-listed species were captured in 2008. Comparison of results for 2008 to previous IDNR collections, using only the 18 stations common to all three surveys showed a similar species number for all 2003 and 2008, and a somewhat lower number of species in 1997 (Table 5).

In 2008, Des Plaines River mainstem fish communities were dominated by tolerant species. Distribution of species was influenced by channel gradient and the presence of the Brandon and Hofmann Dams. IBI scores were moderate to low with no score exceeding 36 points (out of 60 possible). Six of 7 locations showed no definitive trends in IBI over the 3 basin surveys from 1997 to 2008. Sport species were reasonably abundant at several locations downstream of Hofmann Dam, including largemouth bass, channel catfish and sauger (stocked by DNR)

Smaller tributaries in the upper watershed were very poor quality due to channelization and fragmentation by dams. The quality of the tributaries improved moving downstream in the watershed, with Jackson Creek remaining the highest quality tributary in the basin with an IBI of 47. No definitive trends were observed for tributary IBI scores over the three basin surveys.

For the DuPage River system, the channelized, lower gradient East Branch had relatively low IBI scores. Habitat conditions are more diverse and natural on the West Branch, as reflected by higher IBI results. However, the upper station on the West Branch is upstream of several dams and had lower species richness and IBI scores. Upstream of the Channahon, the mainstem had only moderate IBI scores despite good habitat conditions, whereas the station downstream of the Channahon Dam connected to the lower Des Plaines and Upper Illinois Rivers, had the highest in the basin with 58 out of a possible 60 points, with 9 species not found upstream. There was little change in stream quality conditions since the 2003 survey and no definite trend over the longer period since 1997.

Overall, streams within the basin reflect impacts from intensive urban development. With the exception of a few locations, most of the areas we sampled had low to moderate stream quality. Other factors affecting fish communities, included, current and past water quality problems, habitat limitations, and fragmentation due to dams. However, the Des Plaines River system provides sportfishing and other recreational opportunities, and planned dam removals should have positive results for fish communities.

Introduction

The Des Plaines and DuPage River watersheds were surveyed in 2008 by the Illinois Department of Natural Resources (IDNR) and the Illinois Environmental Protection Agency (IEPA). This effort is part of a statewide monitoring program to measure the health of Illinois streams using data from fish community, macroinvertebrate, habitat, water and sediment sampling. Information from basin surveys is also used in watershed planning, fisheries management and other applications.

This report summarizes results of the fish surveys including: species composition, species distribution, and determination of stream quality based on fish community structure, as well as information on the sport fishery. Results from the 2008 survey were compared to previous surveys of Des Plaines/DuPage River Basin conducted in 1997 and 2003. Water quality and other results from the 2008 survey will be published separately in the IEPA 305(b) Water Quality Report (IEPA in prep.)

Watershed Description

The Des Plaines River originates near Racine Wisconsin in Kenosha County, entering Illinois 2 miles North of Rosecrans in Lake County. The river runs primarily south for 97 miles in Illinois where it joins the Kankakee River to form the Illinois River near Channahon (Figure 1). Total watershed area includes approximately 2,110 square miles, 1,231 of which are in Illinois. The drainage area was increased by 673 square miles after diversion of Lake Michigan water through the Sanitary and Ship Canal and the Cal Sag Channel in the early 1900's. The confluence of the Des Plaines River and Sanitary and Ship Canal is located just north of Joliet (Figure 1). A sixteen mile section of the Des Plaines River, from approximately 47th Street to Romeoville, was channelized as part of the Sanitary and Ship Canal Construction.

Overall, the Des Plaines River is a low gradient stream falling about 120 feet in elevation over its 97 miles length in Illinois (1.2 ft/mile). Higher gradient areas are found in a short segment downstream of Hofmann Dam near Lyons and from Romeoville to Sanitary and Ship Canal confluence, where the gradient increases to nearly 7 ft/mile.

The DuPage River is the largest tributary to the Des Plaines River, covering 353 square miles, including highly urbanized areas in DuPage County. Other larger tributaries include Salt Creek (150 sq. mi.), Hickory Creek (107 sq. mi.), Jackson Creek (52 sq. mi.)

and Mill Creek (51 sq. mi). The Des Plaines River Watershed is very narrow, especially in the upper part of the basin, reaching less than 8 miles in width at its narrowest point; therefore many of the tributaries are very short in length with small watershed areas (> 40 sq. mi.).

The watershed includes parts of Lake, Cook, DuPage, Grundy, and Will Counties in Northeastern Illinois (Figure 1). With over 3 million people residing in the watershed, landuse is 58.7% urban development (Figure 2) with only 33.2% of the surface area in agriculture. By comparison, urban land use in the Fox Basin is 15.7% and only 3.5% statewide (Table 1). Parts of the Des Plaines watershed including Salt Creek have very high density development and extensive urban land cover. Tributaries in the lower Des Plaines Basin (Jackson and Hickory Creek) still retain significant agricultural land use.

The Des Plaines/DuPage Watershed has a large number of public wastewater (n=85) and other facilities (n=66) which discharge 1,221 million gallon per day into the stream systems. Much of that flow comes into the lower watershed through the Sanitary and Ship Canal as municipal wastewater originating from Lake Michigan. Mean discharge at Romeoville, downstream of the Sanitary and Ship Canal, is 3,536 cubic feet per second (cfs) for 739 square miles of watershed area, compared to mean discharge at Riverside of 535 cfs for 630 square miles (USGS 2004).

The mainstem of the river has 14 dams including two with locks at Brandon Road and Lockport (Figure 3). The other mainstem dams are lowhead structures, ranging from 1 to 8 feet in height and no longer appear to serve any specific use. A total of 41 tributary dams have been documented, including 10 on Salt Creek and 9 in the DuPage River watershed.

The Des Plaines River Watershed includes 24 State Nature Preserves covering 5,850 acres, Natural Areas totaling over 13,000 acres, and the Des Plaines State Conservation Area (4,600 acres), located near the mouth of the river. Forest Preserve Districts in Lake, Cook, DuPage, and Will Counties own over 300 properties, many of which are in the Des Plaines River Watershed, including extensive areas along the mainstem of the Des Plaines and DuPage Rivers.

Methods

Fish community samples were taken at a total of 30 locations in 2008 (Figure 4, Table 2), including 11 stations on the Des Plaines River mainstem, 13 on direct tributaries to the Des Plaines, and 6 locations in the DuPage River watershed (Figure 5). A total of 19 stations sampled in 2008 were also sampled during the DNR/IEPA 1997 and 2003 Des Plaines Basin Survey with the exception of G-45, GL-01, and GG-04, which were not sampled in 1997.

Fish collection methods followed standard IDNR protocols. At wider, non-wadable stations, fish were sampled using a boat equipped with a 3500 watt - 3 phase generator (AC). When feasible, a supplemental collection was made with a 30-ft., 0.25-in. mesh minnow seine at boat sites. Wadable tributary sites were sampled using a 30-ft. electric seine powered by a single-phase, 1600-watt generator (Bayley et al.1989). At electric seine sites, upstream and downstream limits of each station were blocked by nets to prevent escape and/or entry of fish into the station during sampling. At all stations, larger fish specimens were weighed, measured and returned to the stream. Smaller individuals were preserved and identified in the laboratory.

Sampling was performed from July 9 to August 28, 2008. Stream flows were somewhat elevated during July but decreased to near normal levels as the sampling progressed into August (Figure 6). Sampling time at each station varied based on size of the stream and habitat complexity. Stream width on the mainstem of the Des Plaines River ranged from 33 ft. at Russell Road to 300 ft. at I-55 Bridge while tributary stations ranged from 10 to 70 ft. in width (Table 3).

Index of Biotic Integrity (IBI) scores were calculated for each station using protocols described by Smogor (2004). The IBI evaluates fish community attributes using 10 different parameters, or metrics, each with a possible score of 0-6, and a total score ranging from 0-60. Higher scores indicate better stream quality. Differences between scores of >10 are considered “biologically significant” (Smogor 2004)

Results from the 2008 survey were compared to previous surveys in 1997 and 2003 using stations common to all three surveys. In addition to IBI, comparisons included species composition, distribution, and abundance, including analysis of populations of sport species. Scientific names for all species collected can be found in Table 3 and are not repeated in the text or other tables.

Results

For all 30 stations sampled in 2008, we collected 10,758 fish representing 15 families, 70 species, and 2 hybrid taxa: bluegill X green sunfish and carp X goldfish (Table 4). Five non-native species were collected including, Asian weatherfish, common carp, goldfish, grass carp, and round goby. Threadfin shad and mosquito fish were also present, both southern Illinois species out of their natural range. One grass carp was collected below the Brandon Lock and Dam and no other Asian carp species were collected or observed. No State-listed species were captured in 2008. Comparison of results for 2008 to previous IDNR collections, using only the 18 stations common to all three surveys showed a similar species number for all 2003 and 2008, and a somewhat lower number of species in 1997 (Table 5). For all 3 surveys combined, 72 species, 68 native species, have been collected at the 18 common stations

Des Plaines River - Mainstem

Abundance and Distribution. A total of 4,124 fish, representing 57 species were collected in 2008 at 11 Des Plaines River mainstem stations (Table 6). The number of species ranged from a low of 16 at Daniel Wright Woods (G-35), to a maximum of 29, below the Hofmann Dam at Riverside (G-33). Total abundance ranged from 145 individuals at G-35 to 796 at Division Street (G-11).

The ten most numerous species collected in the mainstem of the Des Plaines River, in order of abundance included: bluntnose minnow, gizzard shad, bluegill, carp, spotfin shiner, blackstripe topminnow, channel catfish, green sunfish, largemouth bass, and white sucker (Table 7). All of these species had wide-spread distributions, and together accounted for over 80% of the total number of individuals collected for the mainstem. Other relatively widespread species appearing at 7 or more of the 11 stations were: northern pike, black crappie, yellow bullhead, Johnny darter, and orangespotted sunfish. A total of 86 non-native round goby were found at 6 of the 11 mainstem stations. It was not present in the 1997 collection, and in 2003 only 2 individuals were found at G-11 located lower in the watershed (Figure 2).

Several native species were found only below the Brandon Lock and dam, including longnose gar (recently observed upstream at Riverside), shorthead readhorse, golden redhorse, and smallmouth buffalo. In addition to these species, several were found only downstream of the Hoffman Dam, including suckermouth minnow, emerald shiner, spottail shiner, quillback, river carpsucker, flathead catfish, white crappie, smallmouth bass, walleye, sauger, and freshwater drum. Round goby were also captured only downstream of the Hoffman Dam. Sauger were stocked by DNR and are a more recent addition (2001) to the river system. Several species were also found only in the upstream, lower gradient areas of the mainstem, including warmouth and spotted sucker. Eleven of the 57 species collected were represented by only one individual and 47% of the species had abundances of less than 10 individuals (Table 7).

Stream Quality. Based on IBI results, stream quality in the mainstem of the Des Plaines River was moderate to low. Scores ranged from 20 to 36 (Table 8) with more than half the stations registering IBI's of less than 30 out of 60 possible points. Examination of individual metrics showed low totals at all stations for *intolerant species* and *sucker species*, as well as low scores for several of the functional metrics such as *proportion of specialist benthic invertivores* and *mineral substrate spawners* (Table 8).

A total of 7 stations have been sampled in all 3 surveys conducted on the Des Plaines River mainstem (Table 9) allowing examination of stream quality trends from 1997 to 2008. Six of the stations, showed no definite trend in IBI scores over that period. G-11 showed an increase in IBI for each of the survey years, with a change of greater than 10 IBI points (the threshold for “biologically meaningful difference” Smogor 2004), over the sampling period.

Sport Fishery. Bluegill, channel catfish and largemouth bass were the 3 most abundant sport species at the mainstem stations (Table 7). Bluegill were by far the most numerous and were relatively abundant at all stations except, G-11 and G-12. These stations are somewhat higher gradient with less pool habitat. These locations also held fewer largemouth bass (Table 6). Although bluegill were very common, few of the fish were larger than 6 inches (Figure 7). Most of the largemouth bass were less than 12 inches, with young of the year (2-4 inches) appearing as the most abundant single size group. Conversely, channel catfish were more abundant in the larger size groups (15 inches and above), with very few younger fish collected (Figure 7). Channel catfish were only found at the stations downstream of the Hofmann Dam at Riverside, with Lemont Road (G-03) being the most productive location (Table 6). Northern pike were more abundant at the upstream, lower gradient stations, with Rt. 120 (G-07) as the most productive spot for this species. A relatively wide range of lengths were present for northern pike with many younger fish and a number of larger individuals over 20 inches (Figure 7). Other moderately abundant species collected in the mainstem were, black crappie, rock bass, and smallmouth bass (Table 6). A few larger (>10 inches) black crappie were present, particularly at Riverside (G-33). Rock bass were only present at a few stations with Rt. 120 (G-07) holding 20 out of the 31 collected, with few individuals larger than 6 inches. Smallmouth bass were only present at the 4 downstream-most stations (Table 6) and all fish collected were less than 12 inches. Sauger were present downstream of Riverside as a result of a DNR stocking program. Several size groups were present with 15 of 19 individuals measuring over 15 inches in length. Table 10 shows total abundance and catch rates (no./hr.) of selected sport species for all three basin surveys, using only stations common to all collections. Catch rates were variable for most species. Channel catfish and black crappie catch rates have increased over the sampling period; northern pike numbers were much higher in 2008. Catch rates were variable for most other species, indicating no definitive trends.

Des Plaines River Tributaries

Abundance and Distribution. A total of 5,197 fish, representing 42 species were collected in 2008 at 13 Des Plaines River tributary stations (Table 11). The number of species ranged from a low of 5 at Hasting Creek to a maximum of 25 collected in Jackson Creek. Total abundance ranged from 23 at Saw Mill Creek to 1039 at Jackson Creek (Table 11). The ten most numerous species collected at tributary stations, in order of abundance were: striped shiner, bluntnose minnow, central stoneroller, green sunfish, white sucker, hornyhead chub, creek chub, Johnny darter, bluegill, and spotfin shiner (Table 12). All species had relatively widespread distributions, although the most numerous species, striped shiner was only found at 6 of the 13 stations. The top 10 species accounted for 84.5% of the total fish collected for tributary stations. Other relatively widespread species appearing at 7 or more of the 13 stations were: largemouth bass, yellow bullhead, and blackstripe topminnow (Table 12). In addition to common carp and goldfish, two non-native species were found in 2008, round goby in Flagg Creek, and Oriental weatherfish in Sawmill Creek. The total number of species collected were similar among all 3 basin surveys for common stations, although species composition differed somewhat, especially among the less numerous species (Table 13).

Stream Quality. For Des Plaines River tributaries, IBI scores were quite variable ranging from 11 at Hastings Creek to 47 at Jackson Creek. Scores were lowest at the smaller streams in the upper watershed and were highest in the downstream tributaries, especially Jackson Creek (Table 14). Similar to the mainstem, individual IBI metric scores for the tributaries were low for *native sucker species* and *intolerant species*.

For the 5 stations common to all 3 surveys, no trends were observed in 4 of the locations. Although IBI scores increased at Indian Creek, the differences among scores were below the "biologically significant" threshold over the period from 1997 to 2008 and were quite similar between 2003 and 2008 (Table 15). Scores were also similar at GL-01 and GG-04 for 2003 and 2008.

Sport Fishery. The most numerous sport species at tributary stations were bluegill, largemouth bass, smallmouth bass, and rock bass (Table 12). Bluegill and largemouth bass were found throughout the basin, whereas, rock bass and smallmouth bass were limited to Hickory and Jackson Creeks in the lower watershed. Populations of all species were composed primarily of smaller fish less than 6 inches in length. A number of younger smallmouth and largemouth bass were present, indicating successful reproduction.

DuPage River System

Abundance and Distribution. A total of six stations were sampled in the DuPage River system, including 2 each on the East Branch, West Branch, and mainstem DuPage River. For all stations combined we collected a total of 1, 436 fish, from 43 species. The number of species varied from 14 to 30, and abundance ranged from 73 to 246 (Table 16). The station GB-01, downstream of the Channahon Dam held the greatest total abundance and the highest number for the DuPage River system. A total of 8 species were captured only at GB-01 below the dam, including gizzard shad, suckermouth minnow, mimic shiner, smallmouth buffalo, black redhorse, blackside darter, logperch, and banded darter. Gizzard shad, blackside darter, and banded darter have been collected upstream of the dam in previous years. River redhorse, a state threatened species was collected in 2003 at GB-01 but not observed at that location in 2008.

The 10 most numerous species collected in the DuPage River watershed included white sucker, bluegill, bluntnose minnow, smallmouth bass, hornyhead chub, sand shiner, carp, rock bass, largemouth bass, and creek chub (Table 17). These species accounted for 78% of the total abundance. All 10 species were relatively widespread except rock bass, which was only found at the lower west branch station (GBK-02) and at the two mainstem stations (GB-11, GB-01). Golden redhorse, silver redhorse, stonecat, and longear sunfish were found only at the two mainstem stations below the Hammel Woods Dam in Plainfield.

Stream Quality. The station downstream of the Channahon Dam (GB-01) had an IBI score of 58 out of 60, the highest score in the DuPage River system and also the highest for the entire Des Plaines River Basin in 2008. Scores upstream of the Channahon Dam ranged from 43 at GB-11 on the mainstem, to 26 at GBL-07 on the East Branch. Higher IBI totals in the lower West Branch and in the mainstem were due to increased scores for several species metrics and most of the proportional metrics (Table 18). IBI scores were very similar at all the DuPage River system stations between 2003 and 2008, with no difference greater than 5 points. We observed no definite trend in IBI scores at GB-11, GBK-07, and GBK-02 over the 3 basin surveys, including 1997, 2003, and 2008 results. Both GB-01 and GBK-07 had much lower scores in 1997, but as noted, have shown little change in the more recent surveys. The East Branch station, GBL-07 also showed a positive trend over the survey period.

Sport Fishery. Similar to other areas of the basin, bluegill were the most numerous sportfish. Although widespread throughout the DuPage River system, most of the fish are in the 3-5 inch range (Figure 8). Smallmouth bass was also relatively abundant for the DuPage River system with an overall catch rate of 21.3 fish per hour (Table 19). Stations on the West Branch held the most smallmouth bass, producing 81 of the 112 found for the whole system (Table 17). A large percentage of the fish collected were in the 5-8 inch size group, most likely 2-3 years in age (Figure 8).

Other relatively abundant sport species included rock bass and largemouth bass. Largemouth bass were present at all stations, however few larger individuals were collected. Like smallmouth bass, rock bass were found only in the lower West Branch and the mainstem of the DuPage River. The greatest numbers were found at GB-11 where we found 34 of the 58 collected for the entire Basin. Over half of the individuals were in the 6 to 9 inch range. Numbers of sportfish for all species were relatively similar between 2003 and 2008 (Table 20).

Discussion

The 2008 Des Plaines River Basin survey provides an overview of fish communities and stream conditions within the Illinois portion of the watershed. We sampled 11 locations on the Des Plaines River mainstem and 13 locations on tributary streams, and 6 locations in the DuPage River system for a total of 30 sampling sites, an increase of 11 over previous surveys in 1997 and 2003 (Pescitelli and Rung 2005). As a whole, the Des Plaines River watershed remains highly urbanized throughout much of its area; and as reported in previous surveys, streams within the basin reflect impacts from intensive development within the basin. With the exception of a few locations, most of the areas we sampled had low to moderate stream quality, with fish communities composed primarily of tolerant species, with few intolerant fishes present. Primary factors affecting Des Plaines River fish communities, as observed in 2008 and as previously reported (Pescitelli and Rung 2005) include, current and past water quality problems, habitat limitations, and fragmentation due to dams. Generally, our results for the 2008 Des Plaines River basin survey agree with the evaluation by Illinois EPA (IEPA 2010) which lists most locations within the watershed as impaired for aquatic life uses. More detailed discussion for the Des Plaines River mainstem, Des Plaines tributaries, and the DuPage River system are provided below.

Des Plaines River Mainstem.

Fish collections within the Des Plaines River mainstem were largely dominated by tolerant species, with few sensitive species present, or present only in low abundance. For example, of the ten most numerous species collected, 5 are considered tolerant (Smogor 2004), and none were in the intolerant category. Tolerant species such as bluntnose minnow, gizzard shad, carp, green sunfish, and white sucker, are generalist, omnivorous fishes, tolerant of a wide range of conditions. These five species together accounted for over 50% of the total abundance on the mainstem (Table 7). Collections from the less urbanized rivers in Northeastern Illinois such as the Fox and Kankakee Rivers, typically contain far fewer tolerant varieties (Pescitelli and Rung 2008, Pescitelli and Rung 2009). The absence and low abundance of more specialized, sensitive species is reflected in the low to moderate IBI scores observed throughout the Des Plaines River mainstem locations (Table 8). Native sucker and invertivorivous species were also particularly low compared to other Northeastern Illinois Rivers. All IBI scores were less than 36, out of a possible 60 points.

As observed in previous surveys, fish community compositions were influenced by general habitat conditions, with stream gradient an important factor. For example, the mainstem upstream of Salt Creek (Figure 1) has a lower gradient, favoring species such as northern pike, blackstripe topminnow and most sunfish varieties. Higher gradient areas in the downstream reaches of the mainstem contained more channel catfish, smallmouth bass, as well as some sucker and native minnow species (Table 8)

Species distribution on the mainstem appears to be influenced by the presence of dams, which serve as migration barriers, particularly the Brandon Road Dam in Joliet and the Hoffman Dam in Riverside (Figure 3). A number of species were found only downstream of these structures. The higher gradient area downstream of the Hoffman Dam held the highest number of species for the mainstem, and also contained a relatively high abundance of sport species. Removal of the Hofmann Dam as currently planned by IDNR and the Army Corps of Engineers should have positive effect on fish communities, locally and in the upper watershed as a whole (Slawski et al. 2009). The area downstream of the Brandon Dam also held a few species which are lacking from the upstream areas, including several sucker species.

Stream quality conditions have been relatively stable over the three sampling periods from 1997 to 2008. Only 7 locations have been sampled in all 3 surveys. Six of those locations showed no definitive trends in IBI scores over the sampling period. Division Street (G-11) showed improvement over the sampling period, with a difference of

11 points between 1997 and 2008, above the 10 point threshold for biologically meaningful change (Smogor 2004). No obvious habitat factors could be attributed to changes in IBI at this location and therefore changes may be due to water quality or sampling conditions. Sampling condition may have affected results at Wadsworth Road (G-07) in 1997 which were much lower than results found in more recent surveys in 2003 and 2008. IBI scores were very similar for these surveys and appear to reflect "normal" conditions at this location.

Des Plaines River Tributaries

Conditions throughout most of the tributary locations were similar to mainstem stations, with low to moderate IBI scores. Scores were very low for the smaller tributary streams in the upper watershed, North Mill and Hastings Creeks. These locations had poor habitat due to previous channelization and were fragmented by dams. Species diversity was especially low due to lack of connection to downstream recruitment sources. Salt Creek also had a very poor quality rating due to channelization, water quality, and fragmentation issues in this highly urbanized watershed (Figure 2). Conditions in Bull, Indian, Flagg, Sawmill and Hickory Creeks were somewhat better due to more diverse habitat conditions and lack of downstream dams. The presence of benthic invertivores and some mineral substrate spawners at these locations suggests less degraded, more natural conditions for both habitat and water quality. Jackson Creek remains the highest quality tributary in the Des Plaines Basin due in part to lower urbanization (Table 1) and also absence of dams. Although the station we sampled in Jackson Creek was previously channelized, there has been some naturalization and recovery of riffles and pools. The area downstream of our sampling location is much less disturbed and is also higher quality with IBIs of greater than 50 (Rung and Pescitelli 2005). Manhattan Creek is a small tributary to Jackson Creek and maintains good habitat conditions in the lower reach. Conditions at the tributary locations have shown little change over the three basin surveys since 1997, as indicated by the IBI scores (Table 15). Although

DuPage River System

The low gradient East Branch of the DuPage River was previously channelized and lacks well developed habitat in most areas which together with high urban land use resulted in relatively low IBI scores. Habitat conditions are more diverse and natural on the West Branch, as reflected by higher IBI results at GBK-02 (Table 18). However, the upper station on the West Branch at GBK-07 is upstream of several dams and is isolated from recruitment sources. Therefore species richness and IBI scores were much lower at GBK-07. In contrast, the station GB-01 is downstream of the Channahon Dam and connected to the lower Des Plaines and Upper Illinois Rivers. The IBI at this station was the highest in the basin with 58 out of a possible 60 points. Results at this station reflect diverse habitat and also the improved conditions in the lower Des Plaines and Upper Illinois. We collected 9 species at this location which were not found upstream of the Channahon Dam. Station GB-11 at Shorewood also had one of the higher IBI scores for the DuPage River system. Dense aquatic vegetation at this location resulted in relatively low abundance (Table 16) for the collection, and species richness may have been underestimated. There was little change in stream quality conditions since the 2003 survey and no definite trend over the longer period since 1997 (Table 8). Lower species numbers at GB-01 observed for the 1997 survey may have been due to lingering effects of a flood of record which occurred in 1996.

Summary

Despite widespread impairments in the Des Plaines River watershed, some selected areas had relatively high species richness and support abundant sportfish populations. These areas on the lower Des Plaines River, West Branch and mainstem of the DuPage River offer opportunities for urban anglers, as well as potential sources of species recruitment for other, upstream areas now fragmented by dams. With the exception of a few stations, our results also suggest fairly stable conditions for fish communities and stream quality throughout much of the watershed over the period from 1997 to 2008. However, overall only 3 stations out of 32 sampled in 2008 exceeded an IBI score of 41, one of the criteria to meet the full aquatic life use designation (EPA 2010).

In comparison to results of a 1983 survey of the Des Plaines Basin (Bertrand 1984, IEPA 1988), conditions have improved in many areas of the watershed. For example, mean species richness and IBI (recalculated using Smogor 2004) for stations on the mainstem of the Des Plaines River were 11 and 17, respectively. In 2008, at the same stations sampled in 1983, we found a mean species richness of 23 and a mean IBI of 29.

Similar improvements have also been observed in some of the tributary streams, particularly Salt Creek, Flagg Creek, Sawmill Creek, and the East Branch of the DuPage River. Considering that conditions have been stable from the period 1997 to 2008, as reported here, it is likely that we have realized most of the benefits resulting from water quality improvements. Although further improvements may be gained from completion of the TARP, or deep tunnel project, designed to address combined sewer over flows, additional restoration measures will likely be necessary for full attainment of aquatic life uses.

Dam removal has been identified as one of the most effective stream restoration techniques. Fragmentation due to dams was shown to be one of the most significant factors affecting fish assemblages on the upper Des Plaines River, even when compared to land use and water quality effects (Slawski et al. 2008). Currently planned removals at the Hofmann, Fairbanks and Armitage Dams, will help reconnect the lower and upper watersheds. Removal of additional mainstem and tributary dams would be a sound approach to restoring the Des Plaines River.

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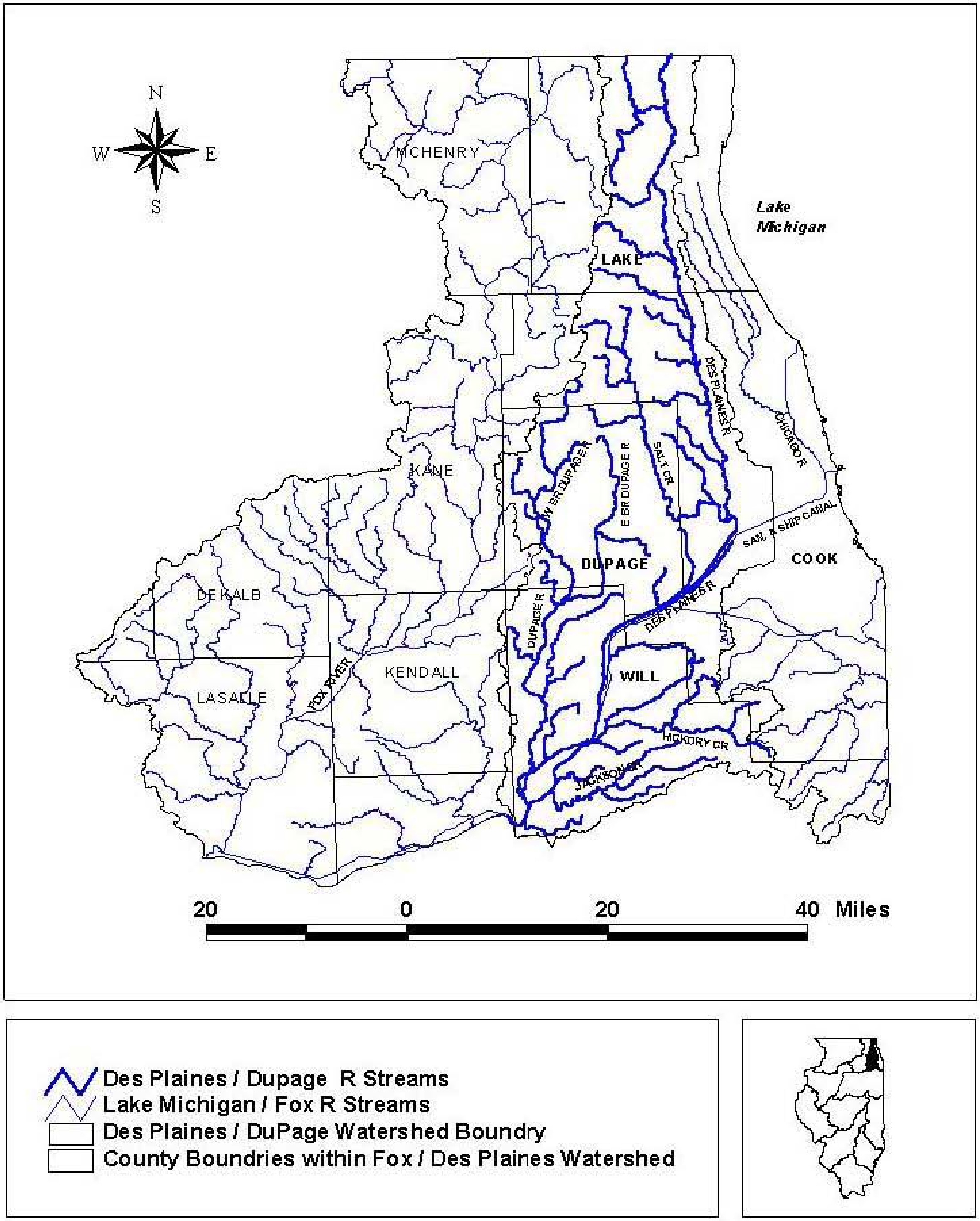

Figure 1. Des Plaines / DuPage River Watershedin relation to other Northeastern Illinois drainages

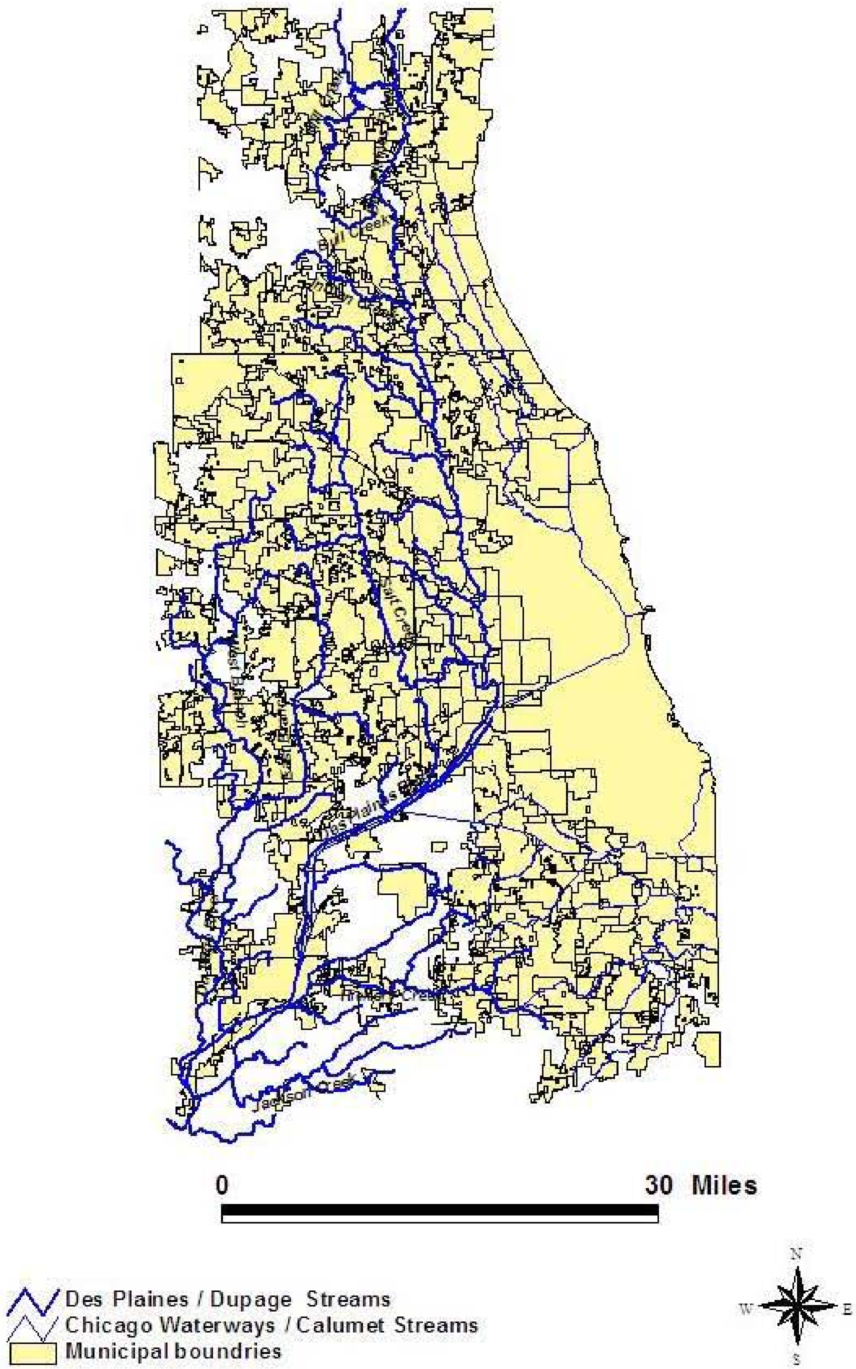

Figure 2. Municiple Boundries indicacing urban landcover in the Des Plaines / DuPage River Watershed

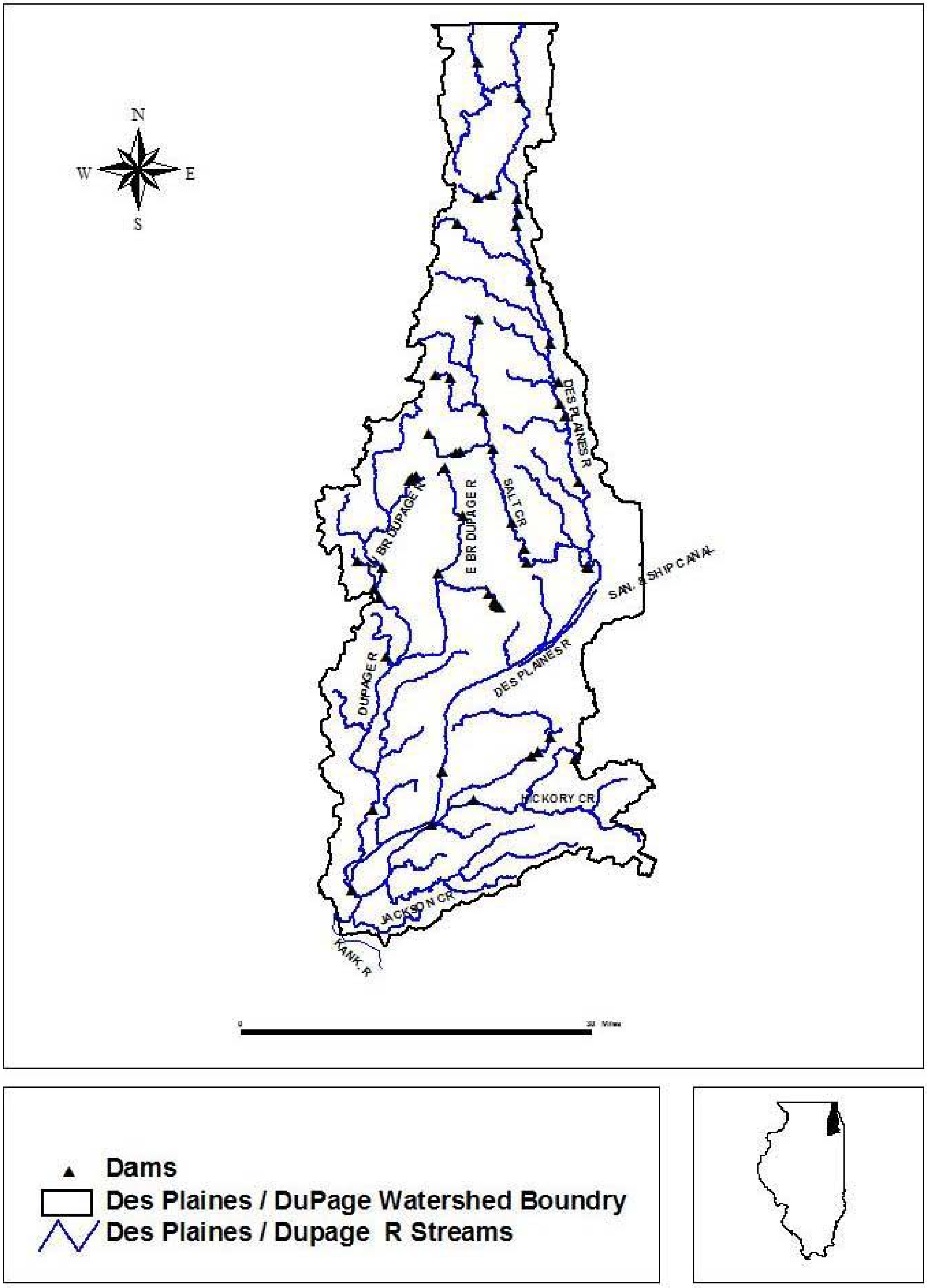

Figure 3. Location of dams in the Des Plaines / DuPage River 2003 watersheds.

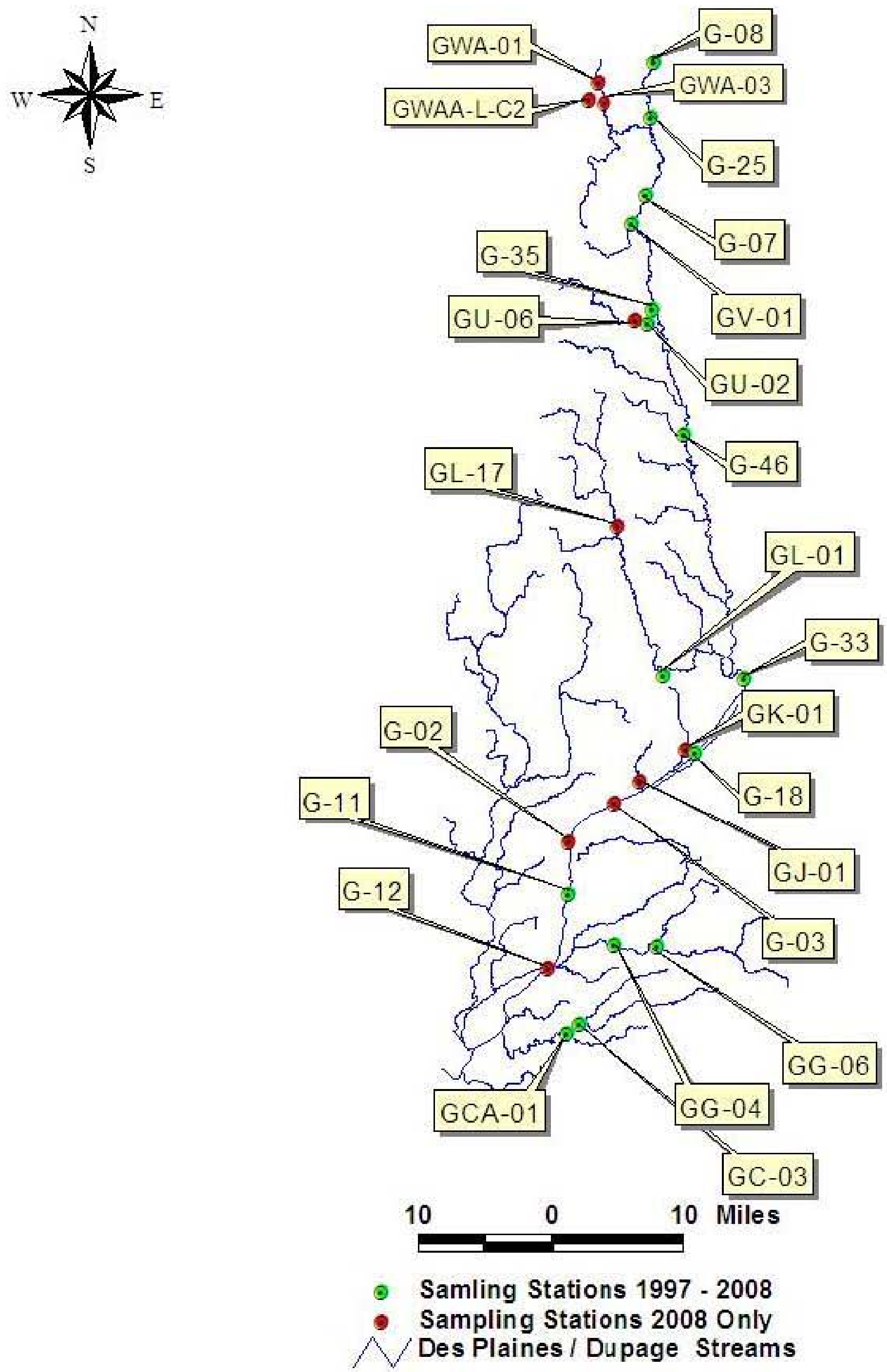

Figure 4. Fish sampling stations for the Des Plaines River and Tributaries for 2008 and previous surveys

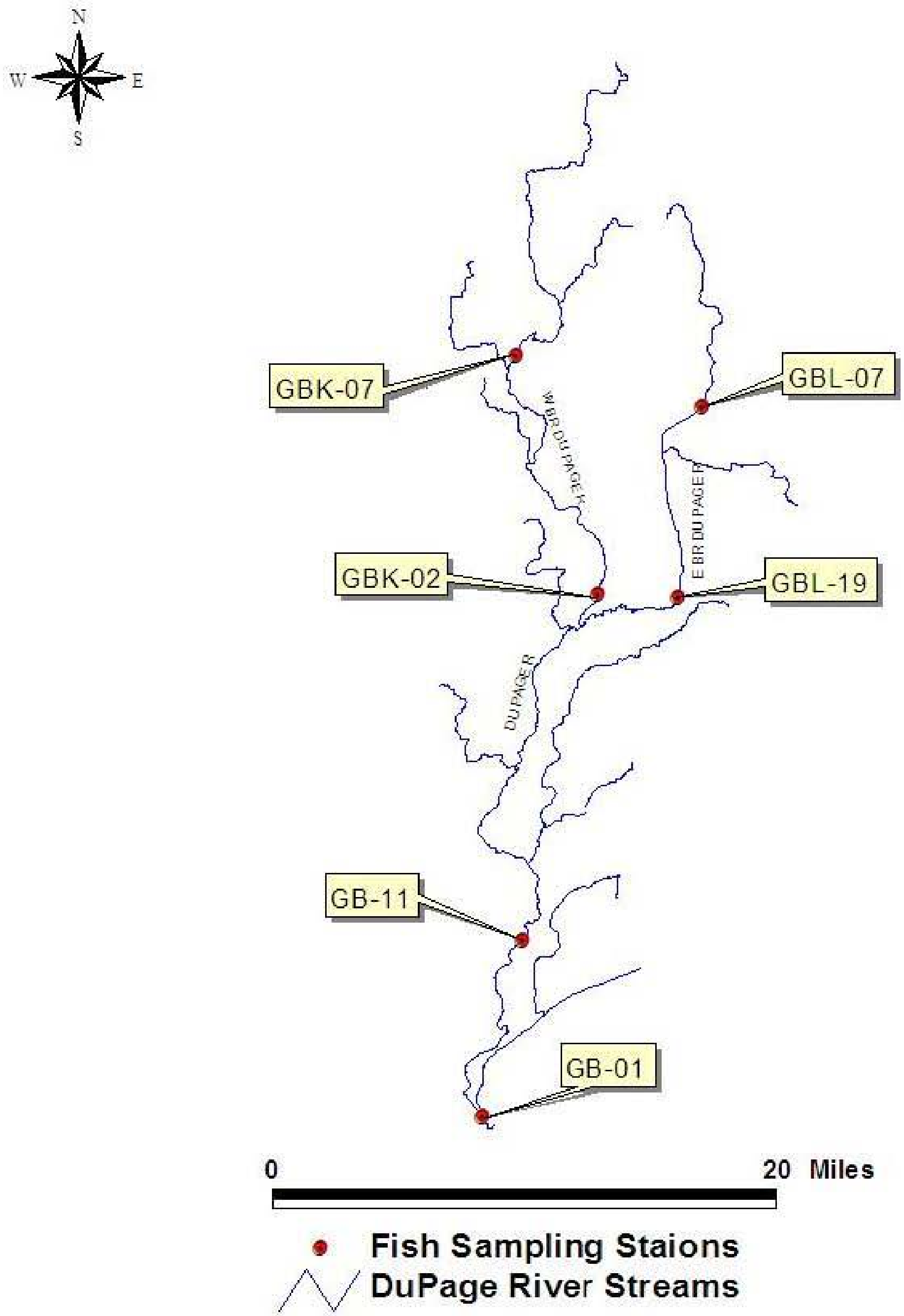

Figure 5. DuPage River fish sampling stations, 2008 Basin survey, also sampled in 1997 and 2003

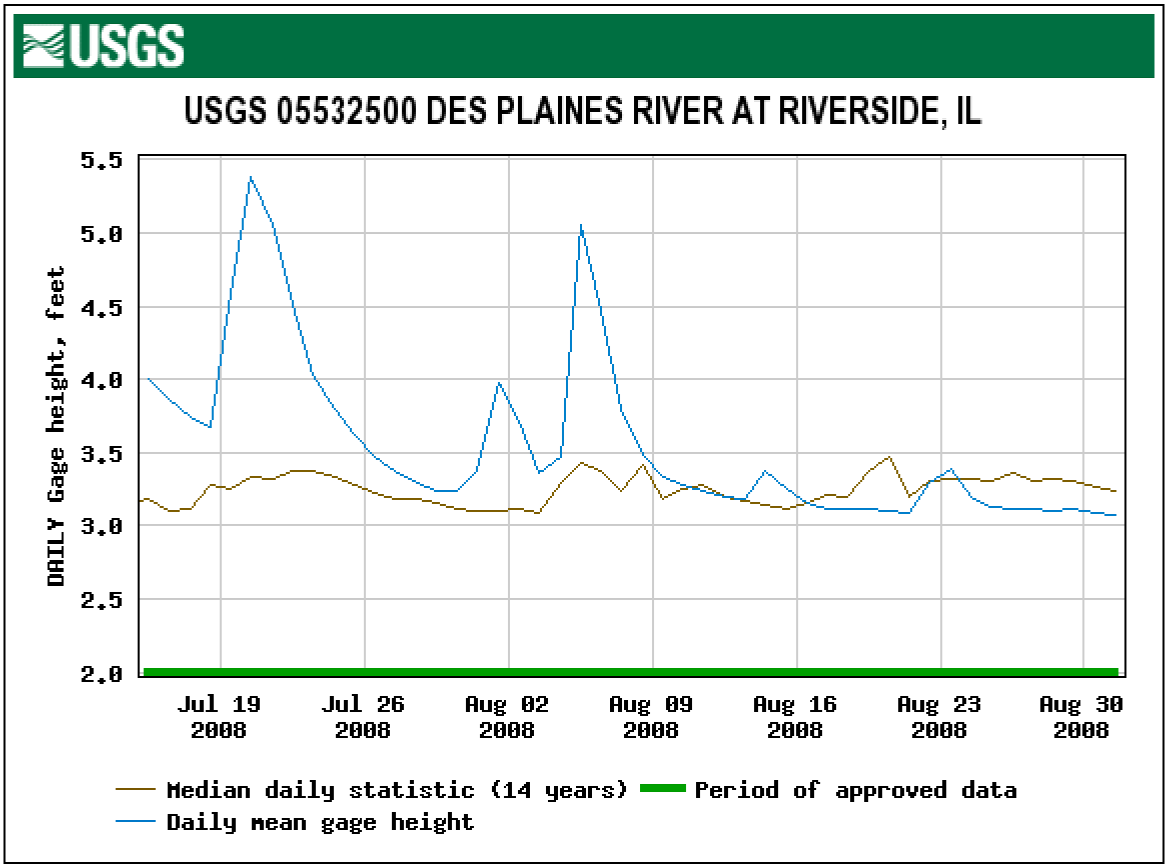

Figure 6. Stream flow conditions for the Des Plaines River at Riverside, IL during the 2008 Des Plaines River Basin Survey.

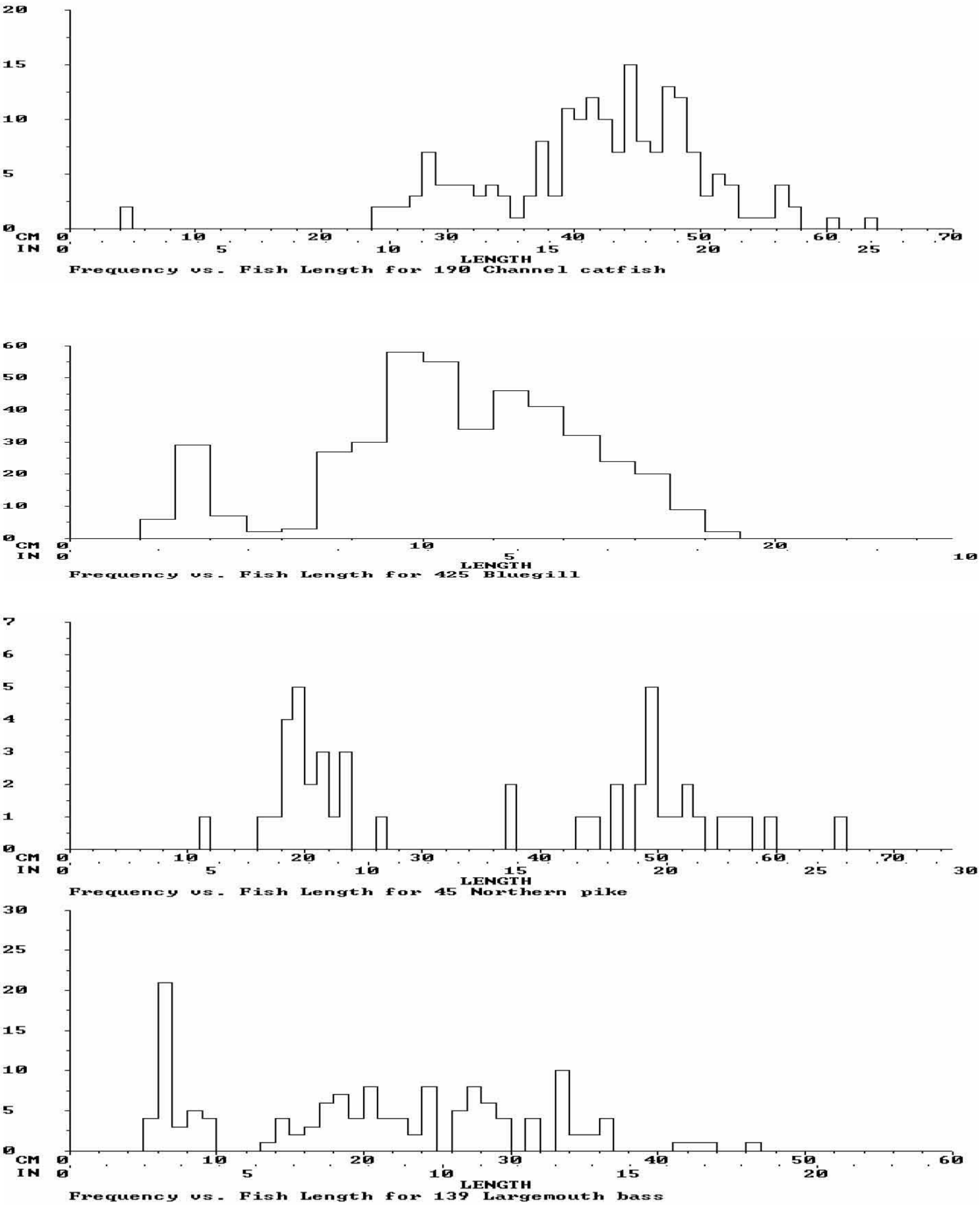

Figure 7. Length frequency distributions for selected sport species from the mainstem of the Des Plaines River.

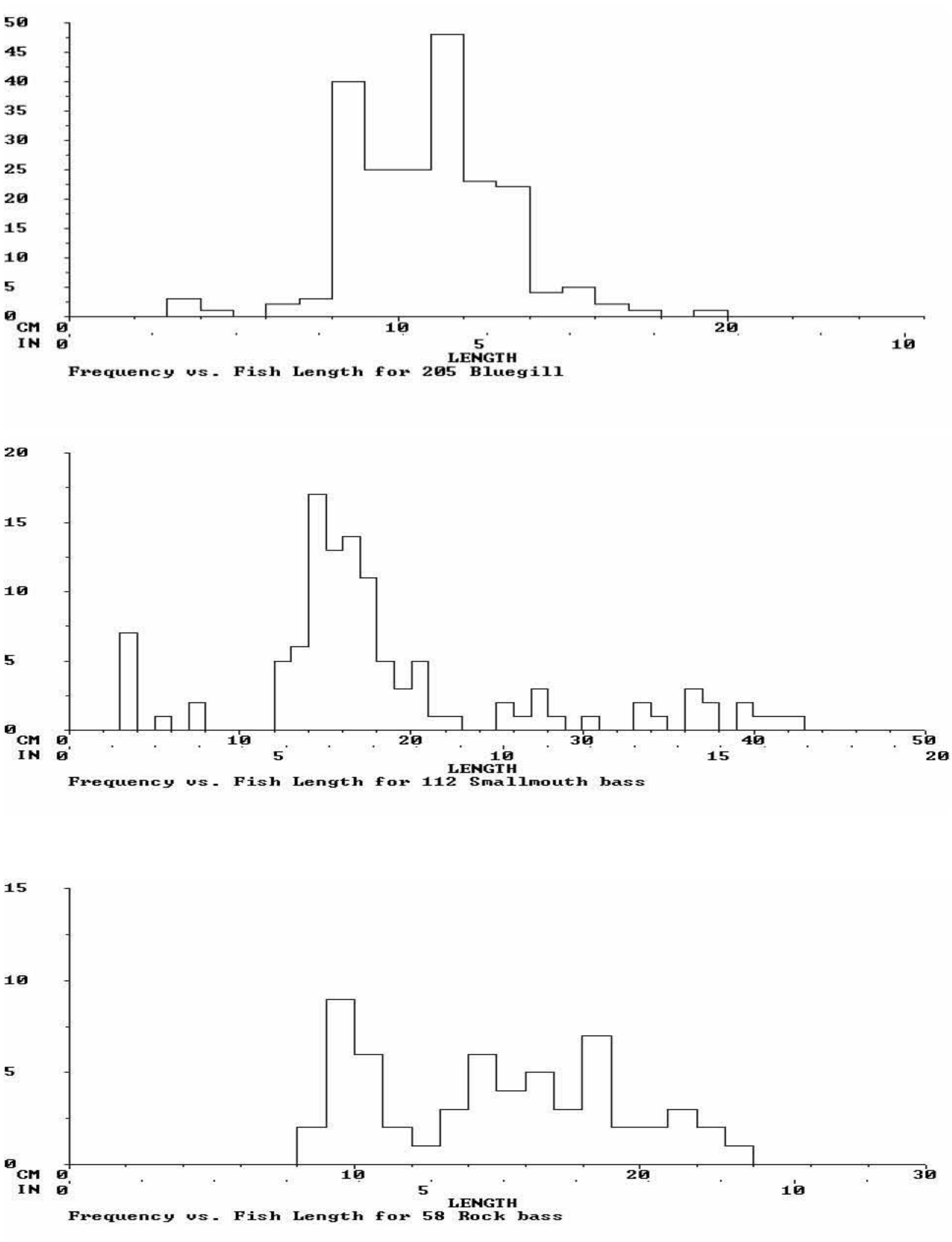

Figure 8. Length Frequency distributions for selected sport species from the DuPage River System.

Table 1. Land use in the upper Illinois River Basin in 1990. Percent by basin.

Landuse	Des Plaines	Fox	Kankakee	Illinois
Urban	58.7	15.7	3.1	3.5
Agricultural	33.2	70.9	90.9	88.8
Forest	5	7	4.4	4.6
Wetland	0.7	2.1	0.8	0.4
Water	1	2.4	0.5	1
Barren	1.5	1.8	0.3	1.8

Table 2 . Description of locations sampled in the 2008 Des Plaines River Basin Survey

IEPA STATION CODE	STREAM	LOCALITY	COUNTY	TWNSHP	RANGE	SECT	QSEC	LAT	LONG
G-08	DES PLAINES RIVER	1 MI DNS WI ST LINE AT RUSSELL	LAKE	46N	11E	3	NE	42.48925	-87.92592
G-25	DES PLAINES RIVER	WADSWORTH RD WADSWORTH	LAKE	46N	11E	34	NE	42.42879	-87.93042
G-07	DES PLAINES RIVER	RT 120 BR W OF GURNEE	LAKE	45N	11E	27	SW	42.34371	-87.9409
G-35	DES PLAINES RIVER	DAN WRIGHT FOREST PRESERVE	LAKE	43N	11E	10	NE	42.21971	-87.93329
G-33	DES PLAINES RIVER	43RD ST RT 66 LYONS	COOK	38N	12E	1	NE	41.81436	-87.80946
G-18	DES PLAINES RIVER	WILLOW SPRINGS RD	COOK	38N	12E	32	SE	41.73545	-87.88166
G-03	DES PLAINES RIVER	US LEMONT RD	COOK	37N	11E	20	NW	41.68156	-88.0022
G-02	DES PLAINES RIVER	135 ST AT ROMEOVILLE	WILL	37N	10E	34	NW	41.64038	-88.0715
G-11	DES PLAINES RIVER	DIVISION ST BR AT LOCKPORT	WILL	36N	10E	27	NE	41.58191	-88.07159
G-12	DES PLAINES RIVER	DOWNSTREAM OF BRANDON RD	WILL	35N	10E	20	NE	41.50039	0
G-01	DES PLAINES RIVER	I-55 BRIDGE 2 MI E CHANNAHON	WILL	34N	9E	16	SE	41.42178	-88.19447
GWA-01	NORTH MILL CREEK	4 MI E ANTIOCH RT 173	LAKE	46N	10E	13	NE	42.465833	-88.008611
GWA-03	NORTH MILL CREEK	DOWNSTREAM RASMUSSAN LAKE US OLD KELLY RD	LAKE	46N	11E	19	SW	42.444221	-88.000557
GWAA-L-C2	HASTINGS CREEK	UPSTREAM MILLER RD AT LAKE CO FPD	LAKE	46N	10E	23	SE	42.447781	-88.0428
GV-01	BULL CREEK	RT 21 MILWAUKEE AV LIBERTYVL	LAKE	44N	11E	9	NE	42.3118	-87.96361
GU-06	INDIAN CREEK	0.8 MILE N PRAIRIE VIEW AT VERNON TWP PARK	LAKE	43N	11E	16	NW	42.206722	-87.960228
GL-17	SALT CREEK	THORNDALE RD AT SALT CREEK COUNTRY CLUB	DUPAGE	40N	11E	4	SW	41.9838	-87.99055
GL-01	SALT CREEK	YORK RD, 0.3 MI N OF OGDEN AVE (SR 34), HINSDALE	DUPAGE	39N	11E	36	SE	41.82073	-87.92701
GK-01	FLAGG CREEK	83RD ST WILLOW SPRINGS	COOK	38N	12E	31	SE	41.73882	-87.89644
GJ-01	SAWMILL CREEK	BLUFF RD ROCKY GLEN FP	DUPAGE	37N	11E	10	SW	41.70839	-87.9554
GG-06	HICKORY CREEK	1 MI NE NEW LENOX	WILL	35N	11E	14	NE	41.52315	-87.94283
GG-04	HICKORY CREEK	GAUGES RD 3 MI E JOLIET	WILL	35N	11E	8	SW	41.52629	-88.00485
GC-03	JACKSON CREEK	ROWEL RD, 3.5MI NE ELWOOD	WILL	34N	10E	11	SE	41.439167	-88.059167
GCA-01	MANHATTAN CREEK	2.5 MI NE ELWOOD	WILL	34N	10E	15	SW	41.43	-88.077222
GBK-02	W BR DUPAGE RIVER	2 MI S NAPERVILLE	WILL	37N	10E	6	NE	42.444221	-88.000557
GBK-07	W BR DUPAGE RIVER	GARYS MILL RD WEST CHICAGO	DUPAGE	39N	9E	15	SE	41.85815	-88.19352
GBL-07	E BR DUPAGE RIVER	SR 56 BR, 0.3 MI E OF SR 53, NW EDGE OF DOWNERS GROVE	DUPAGE	39N	10E	25	SW	41.83163	-88.04765
GBL-19	E BR DUPAGE RIVER	ROYCE RD, 0.1 MI W OF SR 53 BOLLINGBROOK	WILL	37N	10E	3	SE	41.718	-88.0705
GB-11	DUPAGE RIVER	RT 52 BRIDGE SHOREWOOD	WILL	35N	9E	10	SW	41.52157	-88.19483
GB-01	DUPAGE RIVER	OLD RT 6 S CHANNAHON	WILL	34N	9E	17	NW	41.42039	-88.22745

Table 3. Collection methods and station characteristics for the 2008 Des Plaines River Basin Survey (ES= electric seine; BE=boat electrofishing; SH=seine haul).

IEPA STATION CODE	STREAM	DATE	LOCATION	METHODS	SAMPLING TIME (MIN.)	STREAM WIDTH (FT.)	STATION LENGTH (FT.)*
G-08	DES PLAINES RIVER	08/05/08	Russel Road	ES	42	39.1	600
G-25	DES PLAINES RIVER	07/28/08	Wadsworth Road	BE	60	69	
G-07	DES PLAINES RIVER	07/29/08	Belvidere Road, Rt 120	BE	60	71	
G-35	DES PLAINES RIVER	07/31/08	Daniel Wright Woods	BE	60	60.5	
G-33	DES PLAINES RIVER	08/04/08	Riverside/Lyons	BE, SH	60	132	
G-18	DES PLAINES RIVER	07/30/08	Columbia Woods	BE, SH	60	199	
G-03	DES PLAINES RIVER	08/12/08	Lemont Road	BE	60	200	
G-02	DES PLAINES RIVER	07/29/08	Isle a la Cache	BE, SH	60	199	
G-11	DES PLAINES RIVER	07/31/08	Division Street	BE, SH	60	200	
G-12	DES PLAINES RIVER	07/09/08	Brandon Road	BE, SH	30	300	
G-01	DES PLAINES RIVER	07/09/08	I-55	BE, SH	60	300	
GWA-01	NORTH MILL CREEK	08/05/08	Rosecrans Road (Rt 173)	ES	30	15.9	267
GWA-03	NORTH MILL CREEK	08/28/08	Kelly Road-Rasmussen Lake	ES	23	10.3	400
GWAA-L-C2	HASTINGS CREEK	08/05/08	Miller Rd, Raven Glen FP	ES	30	8.1	300
GV-01	BULL CREEK	08/06/08	Rt 21 LCFPD office	ES	23	17.6	350
GU-06	INDIAN CREEK	08/06/08	Prairie Pk/Buffalo Grv Rd	ES	59	26	500
GL-17	SALT CREEK	08/04/08	Thorndale Rd	BE	30	49	
GL-01	SALT CREEK	08/04/08	York Road	BE, SH	60	93	
GK-01	FLAGG CREEK	08/07/08	Chalet Pk, Germ Church Rd	ES	37	29.9	400
GJ-01	SAWMILL CREEK	08/07/08	Water Fall Glen FP	ES	40	33.2	400
GG-06	HICKORY CREEK	07/17/08	Marley Road	ES	48	33.4	560
GG-04	HICKORY CREEK	07/17/08	Pilcher Park	ES	67	38.2	520
GCA-01	MANHATTAN CREEK	07/16/08	Arsenal Road	ES	36	15.8	400
GC-03	JACKSON CREEK	07/16/08	Rowell Road	ES	58	27	730
GBK-07	W BR DUPAGE RIVER	07/23/08	Gary's Mill Road	BE	45	59	
GBK-02	W BR DUPAGE RIVER	07/24/08	Knoch Knolls Park	BE, SH	60	58	
GBL-07	E BR DUPAGE RIVER	07/22/08	Rt 56, Hidden Lakes FP	BE	30	35	
GBL-19	E BR DUPAGE RIVER	07/23/08	Royce Road	BE	60	38	
GB-11	DUPAGE RIVER	07/18/08	Shorewood	BE, SH	60	100	
GB-01	DUPAGE RIVER	07/28/08	Channahon	BE, SH	60	147	

*Electric seine stations

Table 4. Family, common, and scientific names for all fish speices captured during the 2008 Des Plaines River Basin survey, including totals for each species for all stations and methods combined.

Family name	Common name	Scientific name	Total
Lepisosteidae	Longnose gar	Lepisosteus osseus	5
Amiidae	Bowfin	Amia calva	8
Clupeidae	Gizzard shad	Dorosoma cepedianum	598
	Threadfin shad*	Dorosoma petenense	4
Umbridae	Central mudminnow	Umbra limi	4
Esocidae	Northern pike	Esox lucius	48
Cobitidae	Asian weatherfish*	Misgurnus anguillicaudatus	12
Cyprinidae	Grass carp*	Ctenopharyngodon idella	1
	Goldfish*	Carassius auratus	8
	Carp*	Cyprinus carpio	348
	Carp x Goldfish hybrid	Cyprinus carpio x Carassius auratus	6
	Golden shiner	Notemigonus crysoleucas	28
	Creek chub	Semotilus atromaculatus	308
	Hornyhead chub	Nocomis biguttatus	415
	Central stoneroller	Campostoma anomalum	690
	Suckermouth minnow	Phenacobius mirabilis	3
	Striped shiner	Luxilus chrysocephalus	1106
	Redfin shiner	Lythrurus umbratilus	29
	Spotfin shiner	Cyprinella spiloptera	340
	Fathead minnow	Pimephales promelas	40
	Bluntnose minnow	Pimephales notatus	2115
	Emerald shiner	Notropis atherinoides	43
	Rosyface shiner	Notropis rubellus	3
	Bigmouth shiner	Notropis dorsalis	21
	Sand shiner	Notropis ludibundus	236
	Mimic shiner	Notropis volucellus	11
	Spottail shiner	Notropis hudsonius	21
Catostomidae	Bigmouth buffalo	Ictiobus cyprinellus	1
	Smallmouth buffalo	Ictiobus bubalus	38
	Quillback	Carpiodes cyprinus	2
	River carpsucker	Carpiodes carpio	2
	White sucker	Catostomus commersoni	668
	Spotted sucker	Minytrema melanops	46
	Northern hog sucker	Hypentelium nigricans	11
	Shorthead redhorse	Moxostoma macrolepidotum	41
	Black redhorse	Moxostoma duquesnei	1
	Golden redhorse	Moxostoma erythrurum	41
	Silver redhorse	Moxostoma anisurum	9

Family name	Common name	Scientific name	Total
Ictaluridae	Channel catfish	Ictalurus punctatus	212
	Yellow bullhead	Ameiurus natalis	74
	Black bullhead	Ameiurus melas	23
	Flathead catfish	Pylodictis olivaris	3
	Stonecat	Noturus flavus	5
	Tadpole madtom	Noturus gyrinus	8
	Slender madtom	Noturus exilis	1
Cyprinodontidae	Blackstripe topminnow	Fundulus notatus	224
Poeciliidae	Mosquitofish*	Gambusia affinis	44
Moronidae	Yellow bass	Morone mississippiensis	1
Centrarchidae	Black crappie	Pomoxis nigromaculatus	50
	White crappie	Pomoxis annularis	1
	Rock bass	Ambloplites rupestris	148
	Largemouth bass	Micropterus salmoides	291
	Smallmouth bass	Micropterus dolomieu	208
	Warmouth	Lepomis gulosus	5
	Green sunfish	Lepomis cyanellus	521
	Bluegill x Green sunfish hybrid	L. macrochirus x L. cyanellus	60
	Bluegill	Lepomis macrochirus	873
	Pumpkinseed	Lepomis gibbosus	73
	Longear sunfish	Lepomis megalotis	65
	Orangespotted sunfish	Lepomis humilis	35
Percidae	Walleye	Stizostedion vitreum	4
	Sauger	Stizostedion canadense	19
	Yellow perch	Perca flavescens	1
	Blackside darter	Percina maculata	56
	Slenderhead darter	Percina phoxocephala	1
	Logperch	Percina caprodes	16
	Johnny darter	Etheostoma nigrum	273
	Banded darter	Etheostoma zonale	1
	Orangethroat darter	Etheostoma spectabile	23
	Fantail darter	Etheostoma flabellare	24
Scaenidae	Freshwater drum	Aplodinotus grunniens	18
	Round goby*	Neogobius melanostomus	86
		Total fish	10758
		Total species	70
		Native species	63

*non-native species or out of natural range

Table 5. Comparison of fish species collected in 1997, 2003, and 2008 Des Plaines River Basin Surveys, all methods combined, including only station sampled in all three surveys.

Common name	1997	2003	2008
Longnose gar	0	1	0
Bowfin	1	11	11
Gizzard shad	388	276	448
Central mudminnow	11	0	1
Northern pike	17	6	43
Goldfish	1	5	3
Carp	339	272	194
Carp x Goldfish hybrid	5	0	2
Golden shiner	10	13	14
Creek chub	151	353	242
Hornyhead chub	418	370	335
Central stoneroller	982	372	372
Suckermouth minnow	16	7	2
Striped shiner	716	381	926
Common shiner	13	14	0
Redfin shiner	0	22	29
Spotfin shiner	246	348	215
Red shiner	0	1	0
Fathead minnow	19	79	7
Bluntnose minnow	1184	1223	1114
Emerald shiner	42	18	42
Rosyface shiner	2	17	3
Bigmouth shiner	200	149	11
Blackchin shiner	0	1	0
Sand shiner	693	694	147
Mimic shiner	0	8	12
Spottail shiner	0	36	4
Smallmouth buffalo	2	2	7
Quillback	16	53	2
River carpsucker	0	0	1
White sucker	422	823	514
Spotted sucker	17	45	46
Creek chubsucker	1	0	0
Northern hog sucker	26	7	11
River redhorse	0	2	0
Shorthead redhorse	46	55	36
Black redhorse	0	1	1
Golden redhorse	27	40	38
Silver redhorse	2	2	7
Channel catfish	44	69	85
Yellow bullhead	32	44	37
Black bullhead	13	6	7
Flathead catfish	0	0	1
Stonecat	5	10	5
Tadpole madtom	6	1	8
Slender madtom	0	0	1
Blackstripe topminnow	261	531	194
Mosquitofish	0	0	19
Brook silverside	9	31	0
Yellow bass	2	0	1
Striped bass x White bass hybrid (Wiper)	0	1	0
Black crappie	15	23	32
White crappie	0	1	1
Rock bass	31	134	117
Largemouth bass	131	345	153
Smallmouth bass	89	334	144
Warmouth	0	0	4
Green sunfish	424	341	229
Bluegill x Green sunfish hybrid	14	18	29
Bluegill	214	626	501
Pumpkinseed x Bluegill hybrid	1	0	0
Pumpkinseed	18	33	73
Longear sunfish	28	111	65
Orangespotted sunfish	71	151	15
Walleye	3	6	6
Sauger	0	19	11
Yellow perch	0	0	1
Blackside darter	24	23	49
Slenderhead darter	0	2	1
Logperch	0	3	16
Johnny darter	83	79	261
Banded darter	0	2	1
Orangethroat darter	1	1	17
Fantail darter	26	14	24
Freshwater drum	8	6	3
Round goby	0	2	35
Total fish	7564	8676	6975
Total species	51	63	65

Table 6. Abundance of each species collected at Des Plaines River mainstem stations, July and August, 2008; all methods combined. Stations are arranged in order from upstream (left) to downstream (right).

		Russel Road	Wadsworth Road	Rt. 120	Daniel Wright Woods	Riverside	Columbia Woods	Lemont Road	135th Street	Division Street	Brandon Road	I-55 Bridge
Common name	Total	G-08	G-25	G-07	G-35	G-33	G-18	G-03	G-02	G-11	G-12	G-01
Longnose gar	5	0	0	0	0	0	0	0	0	0	2	3
Bowfin	8	2	3	0	0	2	0	1	0	0	0	0
Gizzard shad	580	0	2	0	2	24	72	46	24	340	17	53
Threadfin shad	4	0	0	0	0	0	0	1	0	0	0	3
Central mudminnow	1	0	1	0	0	0	0	0	0	0	0	0
Northern pike	45	2	9	14	8	4	0	2	3	3	0	0
Grass carp	1	0	0	0	0	0	0	0	0	0	1	0
Goldfish	5	0	0	0	0	1	0	0	0	0	0	4
Carp	211	4	25	13	7	13	16	24	31	39	10	29
Carp x Goldfish hybrid	5	0	0	0	0	0	0	0	2	2	0	1
Golden shiner	24	7	4	0	0	2	0	0	1	0	0	10
Creek chub	7	0	0	0	0	0	0	0	0	7	0	0
Hornyhead chub	39	0	0	27	2	7	1	0	2	0	0	0
Central stoneroller	1	0	0	0	0	0	0	0	0	1	0	0
Suckermouth minnow	1	0	0	0	0	0	0	0	1	0	0	0
Striped shiner	3	0	0	0	0	3	0	0	0	0	0	0
Spotfin shiner	207	26	13	31	30	57	9	9	26	4	1	1
Fathead minnow	1	0	0	0	0	1	0	0	0	0	0	0
Bluntnose minnow	1129	3	17	41	7	165	93	163	184	233	9	214
Emerald shiner	38	0	0	0	0	0	0	0	0	37	0	1
Bigmouth shiner	11	0	0	1	0	10	0	0	0	0	0	0
Sand shiner	55	3	1	3	0	41	5	0	2	0	0	0
Spottail shiner	21	0	0	0	0	0	0	1	4	4	12	0
Bigmouth buffalo	1	0	0	0	0	0	0	0	0	0	0	1
Smallmouth buffalo	37	0	0	0	0	0	0	0	0	6	10	21
Quillback	1	0	0	0	0	0	1	0	0	0	0	0
River carpsucker	2	0	0	0	0	0	1	0	0	0	1	0
White sucker	104	0	3	7	18	19	0	1	32	24	0	0
Spotted sucker	46	2	18	13	12	0	1	0	0	0	0	0
Shorthead redhorse	7	0	0	0	0	0	0	0	0	0	7	0
Golden redhorse	3	0	0	0	0	0	0	0	0	0	0	3
Channel catfish	190	2	8	11	0	23	4	63	36	20	12	11
Yellow bullhead	27	6	3	1	1	2	0	5	6	1	0	2
Black bullhead	3	1	2	0	0	0	0	0	0	0	0	0
Flathead catfish	3	0	0	0	0	0	0	0	0	1	0	2
Stonecat	1	0	0	1	0	0	0	0	0	0	0	0
Tadpole madtom	7	3	0	0	0	0	0	0	0	4	0	0

Table 6. Continued	total	G-08	G-25	G-07	G-35	G-33	G-18	G-03	G-02	G-11	G-12	G-01
Blackstripe topminnow	194	117	19	6	3	2	11	6	12	11	0	7
Mosquitofish	44	0	0	0	0	0	2	0	21	17	1	3
Yellow bass	1	0	1	0	0	0	0	0	0	0	0	0
Black crappie	37	1	8	8	1	10	2	7	0	0	0	0
White crappie	1	0	0	0	0	1	0	0	0	0	0	0
Rock bass	31	0	0	20	2	3	0	0	1	0	0	5
Largemouth bass	139	6	24	15	9	13	15	26	8	1	2	20
Smallmouth bass	25	0	0	0	0	0	0	0	5	3	8	9
Warmouth	4	1	2	1	0	0	0	0	0	0	0	0
Green sunfish	145	84	19	5	6	6	1	9	3	0	3	9
Bluegill x Green sunfish hyb.	37	12	5	0	1	1	1	1	0	0	0	16
Bluegill	425	67	58	56	35	30	26	38	42	2	1	70
Pumpkinseed	73	5	65	2	0	0	0	0	0	1	0	0
Orangespotted sunfish	14	3	5	0	1	2	1	1	1	0	0	0
Walleye	3	0	0	0	0	1	0	2	0	0	0	0
Sauger	19	0	0	0	0	6	0	7	1	5	0	0
Yellow perch	1	0	1	0	0	0	0	0	0	0	0	0
Blackside darter	4	3	0	0	0	0	0	0	0	1	0	0
Logperch	2	0	0	2	0	0	0	0	0	0	0	0
Johnny darter	19	1	1	3	0	3	4	0	2	5	0	0
Freshwater drum	18	0	0	0	0	1	0	1	2	2	8	4
Round goby	54	0	0	0	0	8	5	2	11	22	6	0
Total fish	4124	361	317	281	145	461	271	416	463	796	111	502
Total species	57	22	25	22	16	29	19	21	25	26	18	23

Table 7. Number of each species collected by boat electrofishing and seining for all mainstem Des Plaines River stations combined, percent of each species relative to total number collected, number of station where each species were collected, and percent occurrence for each species: number of stations where each species was collected/ total number of stations (11).

Common name	No. collected	Percent of total	No. of stations	Percent occcurence
Bluntnose minnow	1129	27.38	11	100
Gizzard shad	580	14.06	9	82
Bluegill	425	10.31	11	100
Carp	211	5.12	11	100
Spotfin shiner	207	5.02	11	100
Blackstripe topminnow	194	4.70	10	91
Channel catfish	190	4.61	10	91
Green sunfish	145	3.52	10	91
Largemouth bass	139	3.37	11	100
White sucker	104	2.52	7	64
Pumpkinseed	73	1.77	4	36
Sand shiner	55	1.33	6	55
Round goby	54	1.31	6	55
Spotted sucker	46	1.12	5	45
Northern pike	45	1.09	8	73
Mosquitofish	44	1.07	5	45
Hornyhead chub	39	0.95	5	45
Emerald shiner	38	0.92	2	18
Smallmouth buffalo	37	0.90	3	27
Black crappie	37	0.90	7	64
Bluegill x Green sunfish hybrid	37	0.90	7	64
Rock bass	31	0.75	5	45
Yellow bullhead	27	0.65	9	82
Smallmouth bass	25	0.61	4	36
Golden shiner	24	0.58	5	45
Spottail shiner	21	0.51	4	36
Sauger	19	0.46	4	36
Johnny darter	19	0.46	7	64
Freshwater drum	18	0.44	6	55
Orangespotted sunfish	14	0.34	7	64
Bigmouth shiner	11	0.27	2	18
Bowfin	8	0.19	4	36
Creek chub	7	0.17	1	9
Shorthead redhorse	7	0.17	1	9
Tadpole madtom	7	0.17	2	18
Longnose gar	5	0.12	2	18
Goldfish	5	0.12	2	18
Carp x Goldfish hybrid	5	0.12	3	27
Threadfin shad	4	0.10	2	18
Warmouth	4	0.10	3	27
Blackside darter	4	0.10	2	18
Striped shiner	3	0.07	1	9
Golden redhorse	3	0.07	1	9
Black bullhead	3	0.07	2	18
Flathead catfish	3	0.07	2	18
Walleye	3	0.07	2	18
River carpsucker	2	0.05	2	18
Logperch	2	0.05	1	9
Central mudminnow	1	0.02	1	9
Grass carp	1	0.02	1	9
Central stoneroller	1	0.02	1	9
Suckermouth minnow	1	0.02	1	9
Fathead minnow	1	0.02	1	9
Bigmouth buffalo	1	0.02	1	9
Quillback	1	0.02	1	9
Stonecat	1	0.02	1	9
Yellow bass	1	0.02	1	9
White crappie	1	0.02	1	9
Yellow perch	1	0.02	1	9
Total fish	4124			
Total species	57			

Table 8 . Index of Biotic Integrity (IBI) scores for Des Plaines River mainstem stations, July and August, 2008. Includes values for each metric and scores (in parentheses) and total score for each location. Total possible range: 0 - 60. Stations are a

	Russel Road	Wadsworth Road	Rt. 120	Daniel Wright Woods	Riverside	Columbia Woods	Lemont Road	135th Street	Division Street	Brandon Road	I-55 Bridge
IBI Metric	G-08	G-25	G-07	G-35	G-33	G-18	G-03	G-02	G-11	G-12	G-01
Native fish species	. 21 (5)	. 24 (5)	. 21 (4)	. 15 (3)	. 26 (5)	. 17 (3)	. 18 (4)	. 23 (5)	. 24 (5)	. 15 (3)	. 20 (4)
Native minnow species	. 4 (3)	. 4 (3)	. 5 (3)	. 3 (2)	. 8 (5)	. 4 (3)	. 3 (2)	. 7 (5)	. 6 (4)	. 3 (2)	. 4 (3)
Native sucker species	. 1 (1)	. 2 (2)	. 2 (2)	. 2 (2)	. 1 (1)	. 3 (2)	. 1 (1)	. 1 (1)	. 2 (2)	. 3 (2)	. 3 (2)
Native sunfish species	. 7 (6)	. 7 (6)	. 7 (6)	. 6 (6)	. 7 (6)	. 5 (5)	. 5 (5)	. 6 (6)	. 4 (4)	. 4 (4)	. 5 (5)
Benthic invertivore species	. 4 (3)	. 2 (2)	. 5 (4)	. 1 (1)	. 2 (2)	. 2 (2)	. 0 (0)	. 2 (2)	. 4 (3)	. 2 (2)	. 2 (2)
Intolerant species	. 1 (1)	. 1 (1)	. 2 (2)	. 2 (2)	. 1 (1)	. 2 (2)	. 0 (0)	. 2 (2)	. 1 (1)	. 1 (1)	. 1 (1)
Prop. specialist benthic invertivores	. 0.02 (1)	. 0.00 (1)	. 0.02 (1)	. 0.00 (0)	. 0.01 (1)	. 0.01 (1)	. 0.00 (0)	. 0.00 (1)	. 0.01 (1)	. 0.06 (3)	. 0.01 (1)
Prop. geneneralist feeders	. 0.57 (6)	. 0.55 (6)	. 0.65 (5)	. 0.81 (3)	. 0.86 (2)	. 0.85 (2)	. 0.87 (2)	. 0.85 (2)	. 0.86 (2)	. 0.69 (4)	. 0.85 (2)
Prop. mineral-substrate spawners	. 0.01 (1)	. 0.06 (1)	. 0.22 (4)	. 0.11 (2)	. 0.04 (1)	. 0.01 (1)	. 0.02 (1)	. 0.02 (1)	. 0.01 (1)	. 0.14 (3)	. 0.03 (1)
Prop. tolerant species	. 0.24 (5)	. 0.25 (5)	. 0.24 (5)	. 0.33 (5)	. 0.27 (5)	. 0.18 (5)	. 0.28 (5)	. 0.26 (5)	. 0.21 (5)	. 0.20 (5)	. 0.25 (5)
Total IBI	32	32	36	26	29	26	20	30	28	29	26

Table 9. Comparison of Index of Biotic Integrity (IBI) results for Des Plaines River mainstem surveys, 1997, 2003 and 2008. All scores were calculated using boat electrofishing and seine data combined.

Location	IEPA Code	1997	2003	2008
Russell Road	G-08	31	33	32
Wadsworth Road	G-25	20	29	32
Rt. 120	G-07	32	29	36
Daniel Wright Woods	G-35	23	26	26
Riverside	G-33	31	32	29
Columbia Woods	G-18	24	31	26
Division Street	G-11	17	21	28

Table 10. Total number of sport species and catch per hour captured by boat electrofishing for mainstem of the Des Plaines River for Basin Surveys in 1997, 2003, and 2008. Includes only results for six stations common to all surveys.

	1997		2003		2008	
Species	Total	Catch/hr.	Total	Catch/hr.	Total	Catch/hr.
Bluegill	116	24.2	255	45.5	274	45.7
Channel catfish	31	6.5	52	9.3	68	11.3
Largemouth bass	70	14.6	244	43.6	83	13.8
Northern pike	16	3.3	6	1.1	40	6.7
Black crappie	5	1.0	12	2.1	30	5.0
Rock bass	27	5.6	3	0.5	25	4.2
Smallmouth bass	27	5.6	5	0.9	3	0.5
Sauger	0	0.0	19	3.4	11	1.8
total	292	60.8	596	106.4	534	89.0

Table 11. Abundance of each species collected at the Des Plaines River tributary stations, July and August 2008. Stations are arranged by location in the watershed from upstream (left) to downstream (right).

Common name	Total	GWA-01 North Mill Creek	GWA-03 North Mill Creek	GWAA-L-C2 Hastings Creek	GV-01 Bull Creek	GU-06 Indian Creek	GL-01 Salt Creek	GL-17 Salt Creek	GK-03 Flagg Creek	GJ-01 Sawmill Creek	GG-04 Hickory Creek	GG-06 Hickory Creek	GCA-01 Manhattan Creek	GC-03 Jackson Creek
Gizzard shad	10	0	0	0	0	0	0	4	0	6	0	0	0	0
Central mudminnow	3	3	0	0	0	0	0	0	0	0	0	0	0	0
Northern pike	3	0	0	0	3	0	0	0	0	0	0	0	0	0
Goldfish	1	0	0	0	0	0	1	0	0	0	0	0	0	0
Carp	60	1	5	10	0	0	12	32	0	0	0	0	0	0
Carp x Goldfish hybrid	1	0	0	0	0	0	1	0	0	0	0	0	0	0
Golden shiner	3	0	0	2	0	0	1	0	0	0	0	0	0	0
Creek chub	252	0	0	0	14	128	9	0	19	38	0	13	24	7
Hornyhead chub	285	0	0	0	5	111	23	0	20	6	29	42	17	32
Central stoneroller	659	0	0	0	8	27	0	0	162	137	21	63	164	77
Striped shiner	1067	0	0	0	0	16	0	0	1	0	179	226	159	486
Redfin shiner	29	0	0	0	0	0	0	0	0	0	0	0	0	29
Spotfin shiner	100	0	0	0	0	11	61	23	3	1	0	0	0	1
Fathead minnow	38	0	0	0	0	5	0	0	30	3	0	0	0	0
Bluntnose minnow	853	0	0	0	0	204	102	24	191	93	21	9	30	179
Rosyface shiner	3	0	0	0	0	0	0	0	0	0	0	3	0	0
Bigmouth shiner	10	0	0	0	0	0	4	0	6	0	0	0	0	0
Sand shiner	91	0	0	0	0	2	67	0	19	0	0	0	1	2
White sucker	322	0	0	0	1	113	66	22	17	13	3	14	4	69
Golden redhorse	4	0	0	0	0	0	0	0	0	0	0	0	0	4
Channel catfish	6	0	4	0	0	0	0	0	1	0	0	0	0	1
Yellow bullhead	35	1	13	0	0	4	0	4	0	4	2	2	1	4
Black bullhead	19	0	2	0	2	0	4	1	0	9	0	0	0	1
Stonecat	2	0	0	0	0	2	0	0	0	0	0	0	0	0
Slender madtom	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Blackstripe topminnow	22	2	0	0	2	14	1	1	1	0	0	0	0	1
Black crappie	11	0	5	0	0	0	4	2	0	0	0	0	0	0
Rock bass	59	0	0	0	0	0	0	0	0	0	25	7	4	23
Largemouth bass	95	7	22	1	1	9	10	7	0	4	31	1	0	2
Smallmouth bass	71	0	0	0	0	0	0	0	0	0	42	16	9	4
Warmouth	1	0	0	0	0	0	0	0	0	1	0	0	0	0
Green sunfish	349	14	61	1	9	7	1	81	2	33	75	55	8	2
Bluegill x Green sunfish hybrid	17	0	0	0	3	0	8	2	0	4	0	0	0	0
Bluegill	243	10	57	9	13	1	27	30	5	64	19	6	1	1
Longear sunfish	61	0	0	0	0	0	0	0	0	0	0	0	11	50
Orangespotted sunfish	19	0	3	0	0	1	12	2	0	1	0	0	0	0
Walleye	1	0	0	0	0	0	1	0	0	0	0	0	0	0
Blackside darter	51	0	0	0	0	10	0	0	1	6	0	0	8	26
Slenderhead darter	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Johnny darter	248	0	0	0	5	182	0	0	0	5	5	13	13	25
Orangethroat darter	23	0	0	0	0	0	0	0	0	0	6	8	9	0
Fantail darter	24	0	0	0	5	0	0	0	0	0	0	0	11	8
Oriental weatherfish	12	0	0	0	0	0	0	0	0	12	0	0	0	0

Table 11. Continued

Round goby	32	0	0	0	0	0	0	0	32	0	0	0	0	0
Total fish	5197	38	172	23	71	847	415	235	510	440	458	478	474	1036
Total species	42	7	9	5	12	18	18	13	16	18	13	15	17	25

Table 12. Number of each species collected at Des Plaines River tributary stations, percent of each species relative to total number collected, number of station where each species were collected, and percent occurrence for each species: number of station where each species was collected/ total number of stations (13).

Common name	No. Collected	Percent of Total	No. stations	Percent Occurrence
Striped shiner	1067	20.53	6	46
Bluntnose minnow	853	16.41	9	69
Central stoneroller	659	12.68	8	62
Green sunfish	349	6.72	13	100
White sucker	322	6.20	10	77
Hornyhead chub	285	5.48	9	69
Creek chub	252	4.85	8	62
Johnny darter	248	4.77	7	54
Bluegill	243	4.68	13	100
Spotfin shiner	100	1.92	6	46
Largemouth bass	95	1.83	11	85
Sand shiner	91	1.75	5	38
Smallmouth bass	71	1.37	4	31
Longear sunfish	61	1.17	2	15
Carp	60	1.15	5	38
Rock bass	59	1.14	4	31
Blackside darter	51	0.98	5	38
Fathead minnow	38	0.73	3	23
Yellow bullhead	35	0.67	9	69
Round goby	32	0.62	1	8
Redfin shiner	29	0.56	1	8
Fantail darter	24	0.46	3	23
Orangethroat darter	23	0.44	3	23
Blackstripe topminnow	22	0.42	7	54
Black bullhead	19	0.37	6	46
Orangespotted sunfish	19	0.37	5	38
Bluegill x Green sunfish hybrid	17	0.33	4	31
Oriental weatherfish	12	0.23	1	8
Black crappie	11	0.21	3	23
Gizzard shad	10	0.19	2	15
Bigmouth shiner	10	0.19	2	15
Channel catfish	6	0.12	3	23
Golden redhorse	4	0.08	1	8
Central mudminnow	3	0.06	2	15
Northern pike	3	0.06	1	8
Golden shiner	3	0.06	1	8
Rosyface shiner	3	0.06	1	8
Stonecat	2	0.04	1	8
Goldfish	1	0.02	1	8
Carp x Goldfish hybrid	1	0.02	1	8
Slender madtom	1	0.02	1	8
Warmouth	1	0.02	1	8
Walleye	1	0.02	1	8
Slenderhead darter	1	0.02	1	8
Total fish	5197			
Total species	42			

Table 13. Comparison of fish species collected in 1997, 2003, and 2008 Des Plaines River tributaries, including only 5 stations sampled in all three surveys.

Species	2008	2003	1997
Striped shiner	887	339	716
Bluntnose minnow	422	232	659
Central stoneroller	339	314	958
Johnny darter	238	19	52
Hornyhead chub	207	320	398
White sucker	201	97	101
Creek chub	186	39	116
Green sunfish	81	32	87
Longear sunfish	61	90	9
Blackside darter	44	11	8
Rock bass	34	46	22
Smallmouth bass	29	27	21
Redfin	29	21	0
Fantail darter	24	14	26
Bluegill	22	51	8
Blackstripe topminnow	17	137	29
Orangethroat darter	17	1	1
Largemouth bass	13	6	0
Spotfin shiner	12	8	14
Yellow bullhead	11	23	14
Sand shiner	5	15	162
Fathead minnow	5	3	0
Golden redhorse	4	0	1
Bluegill x Green sunfish hybrid	3	0	4
Rosyface shiner	3	17	2
Northern pike	3	0	0
Black bullhead	3	1	0
Stonecat	2	0	4
Orangespotted sunfish	1	2	2
Channel catfish	1	2	0
Slenderhead darter	1	0	0
Slender madtom	1	0	0
Bigmouth shiner	0	1	193
Gizzard shad	0	0	105
Suckermouth minnow	0	0	15
Emerald shiner	0	0	13
Quillback	0	0	12
Common shiner	0	12	3
Pumpkinseed	0	2	3
Carp	0	0	1
Creek chubsucker	0	0	1
Tadpole madtom	0	1	0
Total fish	2906	1883	3760
Total species	31	30	32

Table 14. Index of Biotic Integrity ((IBI) scores for Des Plaines River tributary station, July and August 2008. Includes values for each metric and scores (in parentheses) and total score for each location. Total possible range: 0 - 60. Stations are arranged in order from upstream (left) to downstream (right).

IBI Metrics	GWA-01 North Mill Creek	GWA-03 North Mill Creek	GWAA-L-C2 Hastings Creek	GV-01 Bull Creek	GU-06 Indian Creek	GL-01 Salt Creek	GL-17 Salt Creek	GK-03 Flagg Creek	GJ-01 Sawmill Creek	GG-04 Hickory Creek	GG-06 Hickory Creek	GCA-01 Manhattan Creek	GC-03 Jackson Creek
Native fish species	. 6 (1)	. 8 (2)	. 4 (1)	. 12 (3)	. 18 (4)	. 16 (3)	. 12 (2)	. 15 (3)	. 17 (4)	. 13 (3)	. 15 (3)	. 17 (4)	. 25 (6)
Native minnow species	. 0 (0)	. 0 (0)	. 1 (1)	. 3 (2)	. 8 (4)	. 7 (5)	. 2 (2)	. 9 (5)	. 6 (4)	. 4 (3)	. 6 (4)	. 6 (3)	. 8 (5)
Native sucker species	. 0 (0)	. 0 (0)	. 0 (0)	. 1 (2)	. 1 (2)	. 1 (1)	. 1 (1)	. 1 (2)	. 1 (2)	. 1 (1)	. 1 (2)	. 1 (2)	. 2 (3)
Native sunfish species	. 3 (6)	. 5 (6)	. 3 (6)	. 3 (6)	. 4 (6)	. 5 (5)	. 5 (6)	. 2 (3)	. 5 (6)	. 5 (6)	. 5 (6)	. 5 (6)	. 6 (6)
Benthic invertivore species	. 0 (0)	. 0 (0)	. 0 (0)	. 2 (2)	. 3 (2)	. 1 (1)	. 0 (0)	. 2 (2)	. 2 (2)	. 2 (2)	. 2 (2)	. 4 (3)	. 6 (4)
Intolerant species	. 0 (0)	. 0 (0)	. 0 (0)	. 1 (1)	. 1 (1)	. 1 (1)	. 0 (0)	. 1 (1)	. 1 (1)	. 2 (2)	. 3 (3)	. 2 (2)	. 4 (4)
Prop. specialist benthic invertivores	. 0.00 (0)	. 0.00 (0)	. 0.00 (0)	. 0.14 (5)	. 0.23 (6)	. 0.00 (0)	. 0.00 (0)	. 0.00 (1)	. 0.03 (1)	. 0.02 (1)	. 0.04 (2)	. 0.09 (3)	. 0.06 (3)
Prop. geneneralist feeders	. 0.68 (4)	. 0.83 (3)	. 0.96 (1)	. 0.55 (6)	. 0.58 (6)	. 0.86 (2)	. 0.94 (1)	. 0.58 (6)	. 0.60 (5)	. 0.65 (5)	. 0.68 (4)	. 0.48 (6)	. 0.75 (4)
Prop. mineral-substrate spawners	. 0.00 (0)	. 0.00 (0)	. 0.00 (0)	. 0.18 (2)	. 0.19 (3)	. 0.06 (1)	. 0.00 (0)	. 0.36 (4)	. 0.34 (4)	. 0.66 (6)	. 0.76 (6)	. 0.78 (6)	. 0.66 (6)
Prop. tolerant species	. 0.50 (4)	. 0.38 (5)	. 0.75 (2)	. 0.25 (5)	. 0.33 (5)	. 0.38 (4)	. 0.42 (4)	. 0.33 (5)	. 0.35 (5)	. 0.31 (5)	. 0.33 (5)	. 0.29 (5)	. 0.20 (6)
Total IBI score	15	16	11	34	39	23	16	32	34	34	37	40	47

Table 15. Comparison of Index of Biotic Integrity (IBI) results for Des Plaines River tributary stations, 1997, 2003 and 2008.

IEPA Code	Stream	1997	2003	2008
GV-01	Bull Creek	28	38	34
GU-06	Indian Creek	30	37	39
GL-01	Salt Creek	NA	27	23
GG-04	Hickory Creek	NA	38	34
GG-06	Hickory Creek	37	37	37
GCA-01	Manhattan Creek	40	37	40
GC-03	Jackson Creek	47	41	47

Table 16. Abundance of each species collected at DuPage River stations, July and August 2008. Stations are arranged by location in the watershed from upstream (left) to downstream (right).

		DS Rt 56	Royce Road	Gary's Mill Road	Knock Knolls Park - Naperville	Rt. 52 Shorewood	Below Channahon Dam
		GBL-07	GBL-19	GBK-07	GBK-02	GB-11	GB-01
Common Name	Total	E Branch Dupage R	E Branch DuPage R	W Branch Dupage R	W Branch Dupage R	Dupage River	Dupage River
Gizzard shad	8	0	0	0	0	0	8
Goldfish	2	2	0	0	0	0	0
Carp	77	13	13	10	21	11	9
Golden shiner	1	0	0	1	0	0	0
Creek chub	49	4	11	33	1	0	0
Hornyhead chub	91	0	6	0	79	4	2
Central stoneroller	30	12	10	0	4	0	4
Suckermouth minnow	2	0	0	0	0	0	2
Striped shiner	36	0	2	0	29	0	5
Spotfin shiner	33	3	13	4	5	0	8
Fathead minnow	1	1	0	0	0	0	0
Bluntnose minnow	133	18	18	44	47	0	6
Emerald shiner	5	0	0	0	0	0	5
Sand shiner	90	3	37	48	1	0	1
Mimic shiner	11	0	0	0	0	0	11
Smallmouth buffalo	1	0	0	0	0	0	1
Quillback	1	0	1	0	0	0	0
White sucker	242	65	48	71	38	1	19
Northern hog sucker	11	0	0	0	1	5	5
Shorthead redhorse	35	0	1	0	0	4	30
Black redhorse	1	0	0	0	0	0	1
Golden redhorse	34	0	0	0	0	1	33
Silver redhorse	8	0	0	0	0	2	6
Channel catfish	16	0	1	1	1	11	2
Yellow bullhead	12	1	1	6	4	0	0
Black bullhead	1	0	0	0	1	0	0
Stonecat	2	0	0	0	0	2	0
Blackstripe topminnow	8	0	4	0	1	0	3
Black crappie	2	1	0	0	1	0	0
Rock bass	58	0	0	0	34	12	12
Largemouth bass	57	8	19	8	10	4	8
Smallmouth bass	112	2	15	46	35	8	6
Green sunfish	27	4	5	4	9	0	5
Bluegill x Green sunfish hybrid	6	2	3	0	1	0	0
Bluegill	205	23	60	9	72	7	34
Longear sunfish	4	0	0	0	0	1	3
Orangespotted sunfish	2	0	0	1	0	0	1
Blackside darter	1	0	0	0	0	0	1
Logperch	14	0	0	0	0	0	14
Johnny darter	6	4	0	0	2	0	0
Banded darter	1	0	0	0	0	0	1
total number	1436	166	269	286	397	73	246
number species	43	16	19	14	21	14	30

Table 17. Number of each species collected at DuPage River stations, percent of each species relative to total number collected, number of station where each species were collected (six total stations).

Common name	No. Collected	Percent of Total	No. stations
White sucker	242	16.9	6
Bluegill	205	14.3	6
Bluntnose minnow	133	9.3	5
Smallmouth bass	112	7.8	5
Hornyhead chub	91	6.3	4
Sand shiner	90	6.3	6
Carp	77	5.4	6
Rock bass	58	4.0	3
Largemouth bass	57	4.0	6
Creek chub	49	3.4	4
Striped shiner	36	2.5	3
Shorthead redhorse	35	2.4	3
Golden redhorse	34	2.4	2
Spotfin shiner	33	2.3	5
Central stoneroller	30	2.1	4
Green sunfish	27	1.9	5
Channel catfish	16	1.1	5
Logperch	14	1.0	1
Yellow bullhead	12	0.8	4
Mimic shiner	11	0.8	1
Northern hog sucker	11	0.8	3
Gizzard shad	8	0.6	1
Silver redhorse	8	0.6	2
Blackstripe topminnow	8	0.6	3
Bluegill x Green sunfish hybrid	6	0.4	3
Johnny darter	6	0.4	2
Emerald shiner	5	0.3	1
Longear sunfish	4	0.3	2
Goldfish	2	0.1	1
Suckermouth minnow	2	0.1	2
Stonecat	2	0.1	1
Black crappie	2	0.1	2
Orangespotted sunfish	2	0.1	1
Golden shiner	1	0.1	1
Fathead minnow	1	0.1	1
Smallmouth buffalo	1	0.1	1
Quillback	1	0.1	1
Black redhorse	1	0.1	1
Black bullhead	1	0.1	1
Blackside darter	1	0.1	1
Banded darter	1	0.1	1
total number	1436		
number species	43		

Table 18 . Index of Biotic Integrity (IBI) scores for DuPage River watershed, July and August, 2008. Includes values for each metric and scores (in parentheses) and total score for each location. Total possible range: 0 - 60.

IBI Metrics	GBL-07	GBL-13	GBK-07	GBK-02	GB-11	GB-01
Native fish species	. 14 (3)	. 18 (4)	. 13 (3)	. 20 (4)	. 13 (2)	. 28 (6)
Native minnow species	. 6 (4)	. 7 (4)	. 5 (3)	. 7 (4)	. 1 (1)	. 9 (6)
Native sucker species	. 1 (2)	. 3 (3)	. 1 (1)	. 2 (2)	. 5 (4)	. 7 (5)
Native sunfish species	. 5 (6)	. 4 (5)	. 5 (6)	. 6 (6)	. 5 (5)	. 7 (6)
Benthic invertivore species	. 1 (1)	. 2 (2)	. 0 (0)	. 2 (2)	. 5 (4)	. 10 (6)
Intolerant species	. 1 (1)	. 2 (2)	. 1 (1)	. 3 (3)	. 3 (3)	. 5 (5)
Prop. specialist benthic invertivores	. 0.02 (1)	. 0.01 (1)	. 0.00 (0)	. 0.01 (1)	. 0.16 (6)	. 0.37 (6)
Prop. geneneralist feeders	. 0.83 (3)	. 0.78 (3)	. 0.81 (3)	. 0.58 (6)	. 0.41 (6)	. 0.44 (6)
Prop. mineral-substrate spawners	. 0.08 (1)	. 0.13 (2)	. 0.16 (3)	. 0.46 (6)	. 0.49 (6)	. 0.49 (6)
Prop. tolerant species	. 0.50 (4)	. 0.33 (5)	. 0.54 (3)	. 0.30 (5)	. 0.15 (6)	. 0.14 (6)
IBI	26	31	23	39	43	58

Table 19. Comparison of IBI scores for IDNR IEPA DuPage River Basin surveys 1997 - 2008 2003

IEPA CODE	STREAM	1997	2003	2008
GB-01	DuPage River	38	57	58
GB-11	DuPage River	48	45	43
GBK-02	West Branch	29	39	39
GBK-07	West Branch	19	21	23
GBL-02	East Branch	28	31	26
GBL-07	East Branch	22	27	31

Table 20. Total number of sport species and catch per hour captured by boat electrofishing for DuPage River 1997, 2003, and 2008.

	2008		2003		1997	
Species	Total	Catch/hr.	Total	Catch/hr.	Total	Catch/hr.
Smallmouth bass	112	21.3	177	31.6	89	18.5
Rock bass	58	11.0	63	11.3	31	6.5
Largemouth bass	57	10.9	51	9.1	131	27.3
Channel catfish	16	3.0	17	3.0	44	9.2
total	243	46.3	308	55.0	295	61.5

EXHIBIT 3

suntimes

Sturgeons find operating room

Last Modified: Jan 1, 2012 08:16AM

A lake sturgeon found in a water pipe off Chicago this fall sparked reminders that the great fish of Lake Michigan are coming back. And the big prehistoric fish are great nomads, too.

"They wander around the lake extensively,'' said Rob Elliott, a fisheries biologist with the U.S. Fish and Wildlife Service. "If a fish swims just a mile an hour, it could swim from one end of the lake to the other in about a week.

"With 15 to 25 years to maturity, they wander around for a lot of years before they go back to the rivers where they were spawned. It is not uncommon to find them throughout Lake Michigan. It could have come from a number of rivers in Green Bay or northern Lake Michigan, or six rearing facilities that have been stocking for about the past five years.''

In Illinois, Dan Makauskas, a fisheries biologist with the Lake Michigan program, said they haven't handled any in their studies and work, but years ago commercial netters caught sturgeon occasionally.

Collier Moore caught the most famous hook-and-line sturgeon in Chicago on the Illinois side of Wolf Lake on Feb. 28, 2000. The 45-inch lake sturgeon weighed 20 pounds, 2 ounces and was released.

It had a Wisconsin tag of 5-S-8012. I checked that with Ron Bruch, sturgeon biologist for Wisconsin. Moore's fish was tagged Aug. 11, 1994, about 105 miles upstream of Lake Winnebago on the Wolf River. Then it was 44.8 inches long and weighed 15.25 pounds.

Bruch had guessed Moore's sturgeon made its way to Green Bay, then down Lake Michigan, then somehow through the Chicago canal system and into Wolf Lake, which has been closed to Lake Michigan since World War II.

In Indiana, veteran Lake Michigan fisheries biologist Brian Breidert said they find a live or dead sturgeon almost every year, though they haven't seen one since 2009. The most famous one found in Indiana was a 70-pound dead sturgeon with a radio transmitter that was tagged in Milwaukee.

For such a nomadic large fish, sturgeon show "fidelity to the river of their origin,'' Elliott said.

Those river origins mean each river has its own sturgeon, a point of contention when reintroduction was started. That reintroduction project is a cooperative effort among the feds, tribal bands and the four Great Lakes states.

Wild populations exist on the Manistee, Muskegon, Grand and Kalamazoo rivers in Michigan and the Menominee, Peshtigo, Oconto and Fox rivers in Green Bay. Some sturgeon are being stocked in such rivers as the Milwaukee and Kewaunee in Wisconsin, the Cedar and Whitefish in Michigan's Upper Peninsula and the Manistee and Kalamazoo in lower Michigan with help of innovative streamside rearing facilities.

“Over the next 10-15 years, we anticipate doubling or tripling of sturgeon in the lake because of stocking efforts,’’ Elliott said. “The intent is to get populations to the level where they can sustain themselves naturally.’’

Habitat is the hang-up, especially dams on the rivers that prevent spawning in traditional areas. In terms of food, recent invasive species have helped. As near-shore bottom feeders, sturgeon have plenty of round gobies, zebra mussels and quagga mussels to feed on.

“There are fish out in Lake Michigan similar to what they historically were in size, just not a lot of them,’’ said Elliott, who noted they have handled sturgeon over 200 pounds.

Makauskas put it simply and well, “They belong out there. It would be nice to have them around.’’

Wild things

Word is another wolf was shot in northwest Illinois by a hunter who mistook it for a coyote. That’s becoming a more regular occurrence in Illinois.

Stray cast

Lance Louis running down Kamerion Wimbley on Sunday becomes in offensive lineman lore what a 55-inch muskie engulfing a mallard duck is in muskie lore.