



ASMFC Workshop on Fish Passage Issues Impacting Atlantic Coast States

April 3 & 4, 2008
Jacksonville, Florida

WORKSHOP GOALS

- Initiate development of an ASMFC fish passage protocol that can be applied by the states when addressing future passage issues
- Provide summary of current fish passage technologies and techniques to Commissioners and Technical Committee members
- Provide forum to discuss recent experiences with dam re-licensing and potential future ASMFC/state involvement
- Discuss species-specific fish passage concerns and solutions

ATTENDEES

Steve Arnold (Devine)	Kristen Ferry (MA DMF)	Bill McWha
Bob Beal (ASMFC)	Joel Fleming (GA DNR)	Nichola Meserve (ASMFC)
Jacqueline Benway (CTDEP)	Steve Gephard (CT DEP)	Martha Naley (USFWS)
Tripp Boltin (USFWS)	Bill Goldsborough (CBF)	Marta Nammack (NMFS)
Robert Boyles (SC DNR)	Brian Graber (Am. Rivers)	Cheri Patterson (NH F&G)
Phillips Brady (MDMF)	Melissa Grader (USFWS)	Mark Pawlowski (FERC)
Prescott Brownell (NMFS)	Charles Guthrie (NYS DEC)	Bob Perry (SC DNR)
Tim Brush (Normandeau)	Melanie Harris (NMFS)	Bill Post (SC DNR)
Michelle Burnett (RI F&W)	Alex Haro (USGS)	April Price (Commissioner)
Nancy Butowski (MD DNR)	Michael Hendricks (PA FBC)	Malcolm Rhodes (Commiss.)
Mark Cantrell (USFWS)	Alex Hoar (USFWS)	Fritz Rohde (NC DMF)
John Catena (NOAA)	Carol Hoffman (NYS DEC)	Bob Sadzinski (MD DNR)
Brad Chase (MA DMF)	Reid Hyle (FL FWRI)	Craig Shirey (DE F&W)
Heather Corbett (NJ DFW)	Rick Jacobson (CT DEP)	David Simpson (CT DEP)
Julie Crocker (NMFS)	Pat Keliher (MDMR)	Jeff Smith (NMFS)
K. Damon-Randall (NMFS)	Jake Kritzer (EDF)	Jessie Thomas (ASMFC)
Mike Dionne (NH F&G)	Wilson Laney (USFWS)	Sue Tuxbury (NMFS)
Norm Dube (MDMR)	George Lapointe (MDMR)	Jeff Wilcox (FL FWC)
Guy DuBeck (GA DNR)	Leonard Machut (Tonison)	Gail Wippelhauser (MDMR)
Phil Edwards (RI F&W)	Vin Malkoski (MA DMF)	Spud Woodward (GA DNR)
Steve Edmondson (NOAA)	Sean McDermott (NOAA)	Leroy Young (PA FBC)

SUMMARY

Millions of artificial barriers have been constructed along the Atlantic coast to impound and redirect water for irrigation, flood control, electricity, drinking water, and transportation— all altering natural features of rivers and streams. Recently, many Americans have become increasingly concerned about effects of impoundments on fish and other aquatic species. Many dams are obsolete and no longer serve their original purpose. In many cases, these impoundments serve as a barrier to fish migration, which is fundamental to the life history of

many species. As a result, some populations of native fish are gone and others are on the brink of disappearing.

The Commission is particularly concerned about the migrations to spawning habitat for Atlantic sturgeon, American shad, hickory shad, alewife, blueback herring, and striped bass, and migrations to long-term growth areas for American eel. Without access to these habitats, it will be very difficult to restore populations of these very important diadromous species.

This workshop began with George Lapointe, Commission Chair, introducing these concerns, and noting that for some species, fish passage improvement might be the only option to help advance their recovery. Following the opening remarks, a series of presentations were given on a variety of topics, including: common designs for fish passage available today, fish passage concerns for ASMFC-managed species, experiences with the Federal Energy Regulatory Commission's (FERC) dam re-licensing process, experiences with fish passage and dam removal at non-hydropower dams, case studies on dealing with fish passage, and American eel-specific passage issues.

Throughout the workshop, opportunities were given for discussion of the issues presented, and development of recommendations (32 total) to be brought before the Commission's Interstate Fisheries Management Program (ISFMP) Policy Board. The workshop was very successful, with participants gaining and sharing knowledge on how to improve the fish passage situation along the Atlantic coast.

On May 8, 2008, the full list of workshop recommendations were brought to the ISFMP Policy Board for their consideration. Subsequently, the ISFMP Policy Board requested that staff prioritize the list of recommendations from the workshop, and present them at the Commission meeting in August 2008. These proceedings represent the presentation of that information.

PRESENTATIONS

Below are abstracts for the presentations given at the workshop. For an electronic copy of these workshop proceedings, or the full presentation slides, please visit the Commission's website and navigate the Research and Statistics page: (<http://www.asmfc.org/researchStatistics.htm>).

Presentation on the State of the Art of Fish Passage: Steve Gephard

This talk introduced common terms and descriptions of different types of fish passage facilities to assist attendees with subsequent talks. Design categories included: (1) Technical Fishways, (2) Nature-like Fishways, (3) Dam Removals, and (4) Other (including downstream passage and eel passage). Within the Technical Fishway category were Roughened Chutes, Pool-and-Weirs, and Lifts. Descriptions, photos, and examples of each type of fish passage approach were provided.

Speaker Information:

Steve Gephard

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Presentation on Fish Passage Concerns for Striped Bass: Wilson Laney

Coauthors: Prescott Brownell (USFWS) and Nichola Meserve (ASMFC)

Migratory striped bass of the U.S. Atlantic Coast have been blocked from historic spawning habitats in many East Coast rivers, in some cases for decades. This presentation discussed the idea of restoration of the species, and covered existing technologies for providing striped bass passage up and downstream. These technologies were evaluated using qualitative criteria: size of opening provided (bigger is better); mechanical complexity (simple is better); operation and maintenance costs (low costs are most desirable); safest for the fish (low or no mortality is preferable); and perceived effectiveness (since few or no actual passage efficiency data exist). The existing technologies, ranked in general order of preference, were: 1) obstruction removal; 2) natural channel bypass; 3) rock ramp or weir; 4) breach or notch; 5) vertical slot fishway; 6) Alaskan steep pass or Denil fishway; 7) lock; 8) fish lift; and 9) trap and transport. Of the 50 fish passage projects surveyed, 13 had no passage issues for striped bass. Striped bass were a target species for passage at 15 (41 %) of the remaining 37 projects. Challenges with regard to providing passage for striped bass included: managing our migratory striped bass restoration success; perception that striped bass stocked in reservoirs within the historic range of migratory striped bass functionally replace them (they do not entirely do so); resistance to reintroduction of wild stripers into reservoirs (perception they will introduce diseases, etc.); favoring the established reservoir fisheries over restoration of historic ones; lack of safe, timely, and effective downstream passage technology; and lack of supporting science (ecological as well as technological).

Speaker Information:

Wilson Laney

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Presentation on Fish Passage Concerns for Shad and River Herring, Atlantic and Shortnose Sturgeon, and American Eel: Alex Haro

Fish passage criteria for alosines, sturgeon, and eel are not well developed. Knowledge of general effectiveness of passage structures for these important East Coast species is largely based on empirical data, trial-and-error experiences, and anecdotal information, although some general trends and relationships exist. Technical passage structures originally designed for Pacific salmonids have limited functionality in both upstream and downstream passage for alosines, sturgeon, and eel, but may be appropriate in some cases. New data on behavioral preferences for

these species and controlled experimentation have resulted in development of new structures that show some promise in performance and applicability for certain life stages, but require further development. Other technologies, especially with respect to downstream passage, remain problematic in their implementation for these species in many real-world applications.

Speaker Information:

Alex Haro

Ecologist

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Presentation on the FERC Process, Mark Pawlowski

This presentation was an overview of FERC's licensing program. The session will briefly describe the structure and function of the hydropower divisions with FERC's Office of Energy Projects, the statutory framework in which FERC carries out its licensing responsibilities, and the licensing processes available to license applicants. Opportunities for stakeholder input, standards under which licenses are issued, and current and future challenges will be also be introduced. Topics include: jurisdiction, pre-application document preparation, study development, dispute resolution, balancing of competing resources, and mandatory conditioning authorities.

Speaker Information:

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Presentation on Federal FERC Experiences from the Northeast, Melissa Grader

This presentation focused on: (1) the means of obtaining fish passage that have been used with federal FERC projects in the northeast (with an emphasis on New England); (2) key components to consider when pursuing fish passage; (3) common problems encountered; and (4) lessons learned from past experience. Pros and cons of each method were discussed, as well as examples of what method was used in each instance and why.

Speaker Information:

Melissa Grader

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Presentation on Federal FERC Experiences from the Southeast, Prescott Brownell
Coauthor: Wilson Laney (USFWS)

The anadromous river fisheries for American shad, river herring, sturgeon, and striped bass in the Southeastern states were among the largest in the U.S. prior to 1900. A gradual demise of the fisheries began in the 1700's, largely due to progressive construction of dams and the effects of unregulated river fisheries. After 1940, inland fishery management priorities shifted to reservoir management and resident species, and the once huge anadromous fisheries passed from institutional memory. The rise of ecosystem management principles concurrently with increases in FERC hydropower licensing brought new interest in anadromous fisheries to the South during the 1980's and 1990's. Today, broad interest in anadromous fisheries and fish passage is rapidly growing in the South. The authors described recent successes in fish passage and anadromous fish restoration, and offered recommendations for the role of ASMFC in facilitating fish passage in the Southeast.

Speaker Information:

Prescott Brownell

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Presentation on Federal FERC Experiences from the West Coast: Steve Edmondson

In many California watersheds, such as the Sacramento and San Joaquin (Central Valley), dams block as much as 95% of historic salmonid spawning habitat. As a result, chinook and steelhead salmon are extirpated from approximately 5,700 miles of their historic habitat. In most cases, the habitat remaining is of much lower quality than the habitat lost and is subject to further degradation by direct and indirect impacts of hydroelectric operations. Non-federal FERC licensed dams account for approximately 40% of all surface water storage in Central Valley. There are 122 FERC licensed hydroelectric projects in California. Of this total, there are 42 project licenses that are either currently undergoing relicensing or will expire between 2000 and 2010. In general, relicensing is initiated 5 to 8 years prior to license expiration. Accordingly, workload is expected to increase rapidly in the next few years.

With the term for FERC hydropower licenses generally running from 30 to 50 years, hydropower dams in California present unique challenges to anadromous fish. Many of the existing passage facilities perform poorly. Additionally, many hydropower facilities significantly decrease streamflow, impair water quality and destroy important fish habitat, causing serious harm to anadromous fish. Sections 18 and 10(j) of the Federal Power Act (FPA) assign to NOAA Fisheries broad, and in the case of section 18, mandatory authorities for protecting fish. Consequently, the FPA provides a powerful vehicle for achieving fishery management and species recovery goals by reintroducing viable fish runs to historic habitat; enhancing existing runs through habitat improvements within a river basin; and the timely and safe passage of fish around hydropower projects. Further, by improving flows and other key habitat components,

NOAA Fisheries can increase utilization of the remaining important key coldwater habitat necessary for the stabilization and recovery of many stocks of wild salmonids.

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FERC Case Studies: Kennebec River: Gail Wippelhauser

In the early 1980s, 12 species of native diadromous fishes in the Kennebec River watershed were impacted by the presence of 22 hydropower dams without fish passage. Nine of the dams were located on the mainstem Kennebec, five on the largest tributary (Sebasticook River), five on Messalonskee Stream, and one each on three other tributaries. Historical habitat for American eel was blocked by all 22 dams; Atlantic salmon by 16 dams; alewife, American shad, blueback herring, striped bass, and sea lamprey by 11 dams; and shortnose sturgeon, Atlantic sturgeon, Atlantic tomcod, rainbow smelt, and sea-run brook-trout by a single dam (Edwards). Three multi-party settlement agreements and a standard relicensing have resulted in the removal of two dams (Edwards and Madison Electric Works), and permanent or interim upstream and downstream diadromous fish passage, or a trigger for passage, at the first six dams on the mainstem Kennebec and the first three dams on the Sebasticook River. In addition, downstream passage has been installed voluntarily on one tributary dam.

Speaker Information:

Gail Wippelhauser

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FERC Case Studies: Connecticut River: Melissa Grader

Efforts to restore migratory fish to the Connecticut River watershed began over 150 years ago. This presentation will: (1) provide a brief history of dam construction and fish passage efforts on the mainstem and select tributaries; (2) discuss the important multi-stakeholder partnerships that guide restoration activities in the basin; (3) give an overview of how ASMFC species of interest are managed; and (4) discuss the current status of fish passage (i.e., fishway effectiveness, return data, etc.). Focus will be placed on the particular method that was used to obtain passage at each dam.

FERC Case Studies: Susquehanna River: Michael Hendricks

Fish passage facilities have been constructed at numerous dams in Pennsylvania, including FERC regulated hydro-dams and non-hydro low-head dams. Success of American shad passage

in Pennsylvania has achieved mixed results. The Safe Harbor Dam fish lift on the Susquehanna River passes an average of 71% of the American shad passed at the Holtwood Dam, 6 miles downriver. By contrast, all other Pennsylvania fishways are performing poorly. The Holtwood Dam fish lift passes only 32% of the American shad passed at Conowingo Dam, 16 miles downriver. The York Haven Dam vertical slot fishway passes only 11% of the shad passed at Safe Harbor, 24 miles downriver. On the Lehigh River, the Chain Dam vertical slot fishway passes only 29% of the shad passed at the Easton Dam, 2 miles downriver. Thus, at present, Pennsylvania fishways are not performing well enough to support American shad restoration.

Radio telemetry studies have been conducted at Holtwood and York Haven Dams to evaluate fishway effectiveness. At Holtwood Dam, 136 shad entered the tailrace, but only 44 passed the project. Some 114 (84%) shad were found in a back eddy adjacent to the fishway, 63 of those making more than 5 forays into the back eddy. In addition, only 46 (53%) of the 86 shad that entered the fishway actually passed the fishway. The remaining 40 fish exited the fishway without passing it. Due to drought conditions, no spill occurred during the study, however, it is suspected that during spill, shad are attracted to the spillway and never locate the fishway. At York Haven Dam, 20 shad were detected near the dam but only 15 (75%) were detected near the fishway. Of the 15 that approached the fishway, only four (27%) entered the fishway. Of the four that entered the fishway only one (25%) passed the fishway. Thus, both studies showed that some shad are not approaching the fishway, some shad that approach are not entering the fishway, and some that enter the fishway are not using it. These are serious problems that need to be addressed to improve fishway performance.

An opportunity exists to address the fish passage problems on the Susquehanna River through FERC re-licensing. Conowingo and York Haven Dam hydropower facilities are due for re-licensing in 2014, as is Muddy Run Pumped Storage Project on the Conowingo Pool. Holtwood Dam is also due for re-licensing in 2014, but Holtwood is planning to amend their license to include adding turbines to double the hydraulic capacity of the dam by 2011. Resource agencies have been consulting with Holtwood since 2005 and agreements are in place to improve fish passage and establish fishway performance measures. Resource agencies will begin formal re-licensing proceedings with Conowingo, York Haven, and Muddy Run in mid 2009.

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FERC Case Studies: Santee River Basin: Prescott Brownell

The Santee River Basin is presently the focus of promising interagency diadromous fish restoration efforts. The first large-scale fish passage program in the Southeastern states was established in the 1950's at the Santee – Cooper Project. Additional fish passage for shad and river herring was added at the St. Stephen Power Plant in 1987, and a new fishway recently opened in the upper Santee Basin at Columbia Canal Diversion Dam. Historical perspectives and status of present fish passage successes were described in this presentation.

Presentation on Federal Perspective on Non-Hydropower Dams: John Catena

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Presentation on State Perspective on Non-Hydropower Dams: Steve Gephard

The number of hydropower dams along the East Coast is greatly outnumbered by the number of non-hydropower dams. If we are to achieve progress in diadromous fish restoration to inland watersheds, fish passage must be provided at many of these non-hydropower dams as well. States typically rely on three approaches to achieve such fish passage: regulation, mitigation, and voluntary projects. Each approach was described, using the experience in Connecticut as an example. Voluntary projects (usually community-based) are the most common approach, and a brief review of the process and the available funding was provided.

Presentation on NGO Perspective on Non-Hydropower Dams: Brian Graber

As a non-profit organization focused on riverine ecosystem restoration, American Rivers specializes in dam removal as the most effective long-term approach to fish passage at non-hydropower dams. While not attainable at every dam, more than 650 dams have been removed around the country, with almost 300 removals since 1999. For dam removal to be a possibility, there must be a “hook” for dam owners. State fish passage requirements are seldom used as an impetus to remove non-hydropower dams. More commonly, dam safety regulations are the initial driving force. Dam removal commonly costs less than repairing an aging structure and can cost significantly less when also considering long-term maintenance of a dam and structural fish passage. Because many funding sources exist for dam removal while few exist for dam repair, the full economic equation generates significant interest for dam removal among dam owners. Dam removal is a one-time expense that results in long-term, self-sustaining fish passage and ecosystem restoration. States with successful dam removal programs have similar characteristics, including agency leadership; dam safety offices that enforce regulations; funding sources at both state and federal levels; project managers; and a predictable and in some cases, streamlined, regulatory process.

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Presentation of Projects on the Horizon, Alex Hoar

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Presentation on Barrier Effects on American Eel Populations, Leonard Machut

Dams are among the most pervasive hydrological alterations within watersheds, and their environmental effects have been widely documented. While large dams (e.g., Beauharnois, Moses-Saunders, and Conowingo) are easily recognized as severe migratory barriers, the combined effects of more numerous small low-head dams also play a significant role in distributing American eel throughout its range. Not only do these small barriers also provide vertical, or near vertical, surfaces that are difficult for eels to negotiate, but the sheer abundance of small barriers greatly outnumbers those of large dams. Examination of six Hudson River estuary tributaries showed a 10-fold decline in American eel densities above the first migratory barrier. Study of small dam presence throughout New York known historic eel habitat suggests that the vast majority of New York State freshwater streams have been similarly impacted. Furthermore, a common assumption among fisheries biologists regarding dam development within the Northeastern US is that early industrial revolution era construction drove dam proliferation. This perception may be misleading. Using compiled historic records of American eel distribution in conjunction with temporal increases in dam development, we show the sequence of the restriction of available eel habitat in New York and propose implications for future range-wide health of American eel.

Speaker Information:

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Follow-up Presentation on American Eel Passage Issues, Alex Haro

In light of recent declines of American eels, managers are faced with perplexing questions of not only technical provision of safe upstream and downstream passage of eels, but more general ecological and demographic ramifications of passage mitigation. These questions include: To what extent can passage mitigation offset the current decline? What is the fate of eels that are not allowed access to upstream habitats? Should upstream passage be provided if downstream passage is not? What are the best ways to evaluate effectiveness of passage structures in the context of reproductive success? These and other questions were addressed in this presentation and supported by examples from existing passage problems, as well as theoretical approaches to resolving uncertainties. A general framework for passage mitigation decision-making was also presented.

Case Study: Upper Potomac River, Alex Hoar

RECOMMENDATIONS TO THE ISFMP POLICY BOARD

The following recommendations are based on the discussions that took place during the 2008 Fish Passage Workshop.

Short-term and Ongoing Recommendations

Policies and Approaches

1. Send letters in support of fish passage as project comment.

Recommendations for 2009

Policies and Approaches

1. Develop a policy on passage efficiency for diadromous fishes in cooperation with USFWS and NOAA.
2. Help with prioritization of fish passage projects in the states, and help develop performance criteria.
3. State a preference on comparison of fish passage approaches to support manager decisions.

Fishery Management Plans

1. Set targets for increasing fish passage in each state (this would include a non-binding target, but would have a mandatory compliance requirement to report on progress).

Habitat Committee

1. Spearhead an East Coast Fish Passage Plan. Each state partner should work with federal agencies to develop a roadmap of fish passage priorities in each state, and develop criteria to rank which sites are highest priority for involvement.
2. Develop an outline for how to navigate the FERC dam relicensing process.

Technical Committees

1. Task TCs with developing a tool to evaluate positive and negative consequences of providing fish passage so that managers can make appropriate decisions and lobby effectively for a project.

Long-term or Ongoing Recommendations

Policies and Approaches

1. Take more of an ecosystem-based approach to management, like NMFS and USFWS are mandated to do.
2. Work with federal agencies to improve scientific knowledge on fish passage.
3. Help states research more effective fish passage techniques, and fund research for better designs.
4. Explore the socio-economic dimensions of restoring fish and habitat; this could be a tool to encourage restoration of fisheries.
5. Help states find the needed non-federal match money for fish passage projects, or help states find a way to avoid the requirement to have a non-federal funding match.
6. Encourage states to recruit and train new fishway engineers.

Fishery Management Plans

1. Set an institutionalized goal for habitat to recover access to the historic range for Commission-managed diadromous species.
2. Revise the Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA) to allow more compliance measures in extreme situations.
3. Work with federal agencies to establish a Diadromous Species FMP for federal waters or petition the Secretary of Commerce to establish EFH; this action would open the door for establishing EFH, but defer to the Commission for management of the resource.

Habitat Committee

1. Task Habitat Committee with developing a management plan template to help states with permitting and relicensing of dams.
2. Use ACFHP to bring partners together to address fish passage issues, and involve groups as activists for fish passage.

Technical Committees

1. Task TCs with formally including habitat in stock assessments and restoration goals; this will add more scientific leverage for improving habitat by quantifying the benefits.

Public Relations

1. ASFMC should be a stronger advocate for fish passage, and habitat in general, in the states- particularly in the public arena.
2. Market the ecosystem and provide educational materials to convince the public to care and influence local land use.
3. Encourage fishermen to become more active in habitat issues.

4. Continue inclusion of non-traditional stakeholders on Habitat Committee and species advisory panels.
5. Serve as a central web-based clearinghouse for information on habitat needs for Commission-managed species, and identify priority habitats and fish passage projects.
6. Build more bridges with local groups in more of an activist role.
7. Bring all partners involved in fish passage together, including inland/freshwater agencies.
8. Put together an information package to address habitat issues to help with lobbying efforts.

Workshops and Training

1. Host more workshops for other habitat issues, or regional workshops for helping to get projects started.
2. ASFMC (in partnership with USFWS, NMFS, etc.) could provide training on FERC re-licensing, dam removal, instream flow assessments, conflict resolution, project negotiation techniques, etc.
3. Provide funding to develop a template for routine monitoring and for after completion of a fish passage project.