

Ongoing Ecological/Hydrologic Studies in the Upper Delaware River

This summary was prepared to provide background information on current ecological study efforts in the Upper Delaware River Basin. Studies listed below are summarized in the attached one-page forms. Summary sheets are numbered as shown below.

Number – Study Name

1. Upper Delaware instream habitat assessment
2. Instream temperature modeling in the major tributaries and main stem of the Upper Delaware River
3. Minimum flows required to sustain federally endangered dwarf wedgemussels in the Upper Delaware
4. Determination of host fish for the federally endangered dwarf wedgemussel in the Upper Delaware
5. Dwarf wedgemussel habitat study on the Upper Delaware
6. Flow forecasting improvements for the Upper Delaware River Basin
7. Rate-of-change in flow recommendations
8. Flow, temperature and biological monitoring in the Delaware River tailwaters, 2004-2006
9. Fish inventories of Upper and Middle Delaware River
10. Tri-State Watershed Management Plan

This summary was prepared with the assistance of Don Hamilton, Rich Evans, and Patrick Lynch of the National Park Service, Colin Apse of The Nature Conservancy, Wayne Elliot of the New York State Department of Environmental Conservation, and Alex Hoar of the U.S. Fish and Wildlife Service.

<p>STUDY NAME: Upper Delaware Instream Habitat Assessment</p>
<p>RESPONSIBLE ORGANIZATIONS: U.S. Geological Survey/BRD, Fort Collins; Subcommittee on Ecological Flows</p>
<p>STUDY AREA/REACHES: Upper Delaware tributaries in the tailwaters below NYC reservoirs and the main stem Delaware River upstream of Callicoon. Representative segments of the three tailwaters and the main stem are surveyed and modeled in detail.</p>
<p>PURPOSE:</p> <ul style="list-style-type: none"> • Quantify habitat metrics over a range of discharges and seasons at selected locations in the three tributaries and main stem Delaware • Develop and calibrate an instream network temperature simulation model for the upper Delaware River Basin (a separate summary sheet is provided for this item in summary # 2) • Develop prototype decision support system to assist DRBC and other stakeholders in analyzing and interpreting water management and reservoir operations alternatives.
<p>EXPECTED PRODUCTS:</p> <ul style="list-style-type: none"> • Habitat maps for 11 stream segments (2 in West Branch, 3 in East Branch, 3 in Neversink, and 3 in main stem Delaware) for a range of flows • Habitat time series for each of the 11 segments • Decision support system – either standalone or interface with OASIS • Completion report and documentation
<p>STATUS:</p> <ul style="list-style-type: none"> • Already completed the majority of field work for habitat mapping • Initial products to be available in summer 2005.
<p>EXPECTED COMPLETION DATE:</p> <ul style="list-style-type: none"> • Spring 2006
<p>AMOUNT AND SOURCE OF FUNDS:</p> <ul style="list-style-type: none"> • \$500,000 of federal funds allocated for project in USGS budget (this amount includes funding for the temperature modeling project detailed separately in summary # 2) • Support of NY members of U.S. Congress (Walsh, Hinchey, Clinton, and Schumer) was critical to obtain funding. The Nature Conservancy, Trout Unlimited and the Delaware River Foundation worked with congressional staff on the appropriation.
<p>CONTACT INFORMATION: Colin Apse, The Nature Conservancy, capse@tnc.org, (845) 255-9051 Ken Bovee, USGS, Fort Collins, ken_bovee@usgs.gov, (970) 226-9320</p>

<p>STUDY NAME: Instream Temperature Modeling in the Major Tributaries and Main Stem of the Upper Delaware River</p>
<p>RESPONSIBLE ORGANIZATIONS: U.S. Geological Survey/BRD, Fort Collins; Subcommittee on Ecological Flows</p>
<p>STUDY AREA/REACHES: West Branch Delaware River, East Branch Delaware River, Beaver Kill, Neversink River, Upper Delaware River upstream of Callicoon</p>
<p>PURPOSE:</p> <ul style="list-style-type: none"> • Develop and test the applicability of an existing stream network water temperature model, with daily time step, for the period May 1-October 31 • Improve the ability to forecast longitudinal water temperature as a function of reservoir releases, network hydrology, and ambient meteorological conditions • Enable improved design of reservoir releases for temperature control.
<p>EXPECTED PRODUCTS:</p> <ul style="list-style-type: none"> • Calibrated and validated stream network temperature model that predicts mean daily and maximum daily water temperature at multiple locations in each river reach studied, including West Branch at Hancock, East Branch at Harvard, main stem at Hankins, and Neversink at Bridgeville (Phase 1) • Comparison of prediction ability of new model versus existing nomographs • Modify modeling software to operate in “real time” with predictions of tomorrow’s meteorology and hydrology (Phase 2 – this task will be conducted if previous tasks are successful)
<p>STATUS:</p> <ul style="list-style-type: none"> • Phase 1 work essentially complete as of March 1, 2005
<p>EXPECTED COMPLETION DATE:</p> <ul style="list-style-type: none"> • Spring 2006
<p>AMOUNT AND SOURCE OF FUNDS:</p> <ul style="list-style-type: none"> • Line item in USGS budget (amount is reported in habitat assessment project, detailed separately in summary # 1) • Support of NY members of Congress (Walsh, Hinchey, Clinton, and Schumer) was critical to obtain funding. The Nature Conservancy, Trout Unlimited and the Delaware River Foundation worked with congressional staff on the appropriation.
<p>CONTACT INFORMATION: John Bartholow, USGS/BRD, 970-226-9319, john_bartholow@usgs.gov</p>

<p>STUDY NAME: Minimum Water Flows Required to Sustain Federally Endangered Dwarf Wedgemussels in the Upper Delaware</p>
<p>RESPONSIBLE ORGANIZATIONS: National Park Service University of Maryland, Center for Environmental Science</p>
<p>STUDY AREA/REACHES: Upper Delaware River</p>
<p>PURPOSE:</p> <ul style="list-style-type: none"> • Determine the relationship between water flow recorded at operational USGS gage stations in the Upper Delaware River and water flow, depth, and surface coverage at three known dwarf wedgemussel locations within the Upper Delaware River. • Determine the influence of upstream water discharge source on water temperature profiles at dwarf wedgemussel locations in the Upper Delaware River.
<p>EXPECTED PRODUCTS:</p> <ul style="list-style-type: none"> • A report describing the findings of the study. • Established relationships to predict how river flows express themselves as habitat (flow velocity, depth, substrate coverage, temperature) at three dwarf wedgemussel sites in the Upper Delaware River.
<p>STATUS:</p> <ul style="list-style-type: none"> • Ongoing: 2005 will be second year of field measurements.
<p>EXPECTED COMPLETION DATE:</p> <ul style="list-style-type: none"> • December 2005
<p>AMOUNT AND SOURCE OF FUNDS:</p> <ul style="list-style-type: none"> • \$50,000 National Park Service
<p>CONTACT INFORMATION: Jeff Cole (UMCES), Don Hamilton (NPS-UPDE)</p>

<p>STUDY NAME: Determination of Host Fish for the Federally Endangered Dwarf Wedgemussel (<i>Alasmidonta heterodon</i>) in the Upper Delaware River</p>
<p>RESPONSIBLE ORGANIZATIONS: National Park Service Penn State University</p>
<p>STUDY AREA/REACHES: Upper Delaware River</p>
<p>PURPOSE:</p> <ul style="list-style-type: none"> • Determine species of fish historically present in the Upper Delaware River during late spring and early summer (spawning timeframe for mussels). • Determine which of these species may act as hosts for the dwarf wedgemussel <i>Alasmidonta heterodon</i>.
<p>EXPECTED PRODUCTS:</p> <ul style="list-style-type: none"> • A report describing the findings of the study. • Determination of present fish species that serve as hosts (can be infected by mussel glochidia (larvae) and transform glochidia to juvenile mussels) for dwarf wedgemussels in Upper Delaware River.
<p>STATUS:</p> <ul style="list-style-type: none"> • Ongoing: 2005 will be first year of field/lab studies.
<p>EXPECTED COMPLETION DATE:</p> <ul style="list-style-type: none"> • December 2006
<p>AMOUNT AND SOURCE OF FUNDS:</p> <ul style="list-style-type: none"> • \$50,000 National Park Service
<p>CONTACT INFORMATION: Barbara White (PSU), Don Hamilton (NPS-UPDE)</p>

<p>STUDY NAME: Dwarf Wedgemussel (DWM) Habitat Study on the Upper Delaware</p>
<p>RESPONSIBLE ORGANIZATIONS: U.S. Fish and Wildlife Service</p>
<p>STUDY AREA/REACHES: Delaware River from Hancock, NY to Montague, NJ</p>
<p>PURPOSE:</p> <ul style="list-style-type: none"> • Determine the effect of changes in the flow regime of the Upper Delaware River on dwarf wedgemussel beds, and develop a strategy to help in the recovery of the dwarf wedgemussel and avoid potential future impacts to this endangered species.
<p>EXPECTED PRODUCTS:</p> <ul style="list-style-type: none"> • A habitat simulation model of the areas that could be affected by water management in the Upper Delaware River. • Habitat model of river sections with known dwarf wedgemussel beds. • A GIS map of the areas that contain the potential for mussel beds, which either have not been found yet or have a high recovery potential. • A list of improvement measures (flow and channel) and evaluation of the protection and recovery benefits to DWM. • Criteria for flow augmentation including durations, frequency and ramping rates. • A list of seasonal flow management scenarios that would support the recovery of DWM, and be non-detrimental to existing populations of DWM. • Operational schemes and rules for the maintenance of flow scenarios, including an analysis of the availability of water in the system. • Enhanced understanding of flow distribution in the Upper Delaware that will support efforts to protect, manage, and enhance other members of the ecosystem.
<p>STATUS:</p> <ul style="list-style-type: none"> • Not started, but expect to start this season.
<p>EXPECTED COMPLETION DATE:</p> <ul style="list-style-type: none"> • 2008
<p>AMOUNT AND SOURCE OF FUNDS:</p> <ul style="list-style-type: none"> • <u>Amount.</u> \$211,000 for 2005. This is the first year of this 3-year study. Funding is expected at about same level for year two and three, but is dependent in large part on the availability of federal matching funds. • <u>Sources.</u> PPL Corporation and U.S. Army Corps of Engineers
<p>CONTACT INFORMATION: Alex Hoar, U.S. Fish and Wildlife Service, 413-253-8631, Alex_Hoar@fws.gov</p>

<p>STUDY NAME: Flow Forecasting Improvements for the Upper Delaware River Basin</p>
<p>RESPONSIBLE ORGANIZATIONS: U.S. Army Corps of Engineers, National Weather Service, NYSDEC, NYCDEP, The Delaware River Foundation, The Nature Conservancy, Trout Unlimited, Delaware River Basin Commission</p>
<p>STUDY AREA/REACHES: West Branch Delaware River, East Branch Delaware River, Upper Delaware River, Beaver Kill, Neversink River</p>
<p>PURPOSE:</p> <ul style="list-style-type: none"> To expand National Weather Service flow forecasting to eight additional stream gage locations in the Upper Delaware River Basin. These forecasts will support the design of releases to control temperature and meet flow targets specified in reservoir releases programs.
<p>EXPECTED PRODUCTS:</p> <ul style="list-style-type: none"> Upgraded precipitation and air temperature monitors at five National Weather Service stations to facilitate improved flow forecasting. Establish a new USGS stream gaging station for the Delaware River at Lordville. Daily National Weather Service flow forecasts for: 1) West Branch Delaware River at Hale Eddy, NY; 2) West Branch Delaware River at Hancock, NY; 3) Delaware River at Hankins, NY; 4) Delaware River at Lordville, NY; 5) East Branch Delaware River at Harvard, NY; 6) Beaver Kill at Cooks Falls, NY; 7) Neversink River at Bridgeville, NY; 8) East Branch Delaware River at Fish's Eddy, NY
<p>STATUS:</p> <ul style="list-style-type: none"> Draft Section 22 Cost Share Agreement and Scope of Work are complete. Cost estimate is complete and five local sponsors have agreed on cost shares. Invoicing and payment of local cost shares is required prior to commencing work.
<p>EXPECTED COMPLETION DATE:</p> <ul style="list-style-type: none"> Equipment installation by end of 2005 Forecasts at seven of eight stations by mid-2006 Forecasts at Lordville station to be provided after multi-year data collection and calibration.
<p>AMOUNT AND SOURCE OF FUNDS:</p> <ul style="list-style-type: none"> Total Cost of \$133,000 Local Sponsor Share = \$41,500 Cash, \$25,000 In-kind Cash provided by Corps of Engineers = \$66,500
<p>CONTACT INFORMATION: Rick Fromuth, DRBC; Bill Mueller, Corps of Engineers; D. Muralidhar, NYSDEC</p>

<p>STUDY NAME: Rate-of-change in Flow Recommendations</p>
<p>RESPONSIBLE ORGANIZATIONS: DRBC Subcommittee on Ecological Flows (SEF)</p>
<p>STUDY AREA/REACHES: Tailwaters below NYC reservoirs, particularly below Cannonsville</p>
<p>PURPOSE:</p> <ul style="list-style-type: none"> • Define recommendations for ramping rates below NYC reservoirs during releases for Montague Flow Target and Thermal Protection
<p>EXPECTED PRODUCTS:</p> <ul style="list-style-type: none"> • A set of recommendations that can be implemented by the Parties to the Decree for short-term increases and decreases in flow releases.
<p>STATUS:</p> <ul style="list-style-type: none"> • In progress
<p>EXPECTED COMPLETION DATE:</p> <ul style="list-style-type: none"> • Initial recommendations by end of 2005 • Final recommendations by end of 2006
<p>AMOUNT AND SOURCE OF FUNDS:</p> <ul style="list-style-type: none"> • None, volunteer time of SEF membership
<p>CONTACT INFORMATION: Colin Apse, The Nature Conservancy, capse@tnc.org, (845) 255-9051</p>

<p>STUDY NAME: Flow, Temperature and Biological Monitoring in the Delaware River Tailwaters, 2004-2006</p>
<p>RESPONSIBLE ORGANIZATIONS: New York State DEC; Divisions of Water and Fish and Wildlife</p>
<p>STUDY AREA/REACHES: Primarily within trout sections below Neversink, Pepacton and Cannonsville reservoirs</p>
<p>PURPOSE:</p> <ul style="list-style-type: none"> Assess conditions and biological responses to implementation of Revision 7 (DRBC Docket D-77-20 CP), particularly with regard to maintenance of minimum habitat flows
<p>EXPECTED PRODUCTS:</p> <ul style="list-style-type: none"> Annual monitoring reports for each year describing release (bank) management, maintenance of thermal and flow targets, quantitative trout population estimates for eleven tailwater and two control stations, and biomonitoring results
<p>STATUS:</p> <ul style="list-style-type: none"> On target Currently preparing 2004 status report
<p>EXPECTED COMPLETION DATE:</p> <ul style="list-style-type: none"> 2004 monitoring report to be submitted mid-March, 2005 Final report completed May 31, 2007
<p>AMOUNT AND SOURCE OF FUNDS:</p> <ul style="list-style-type: none"> Total cost of the three-year project is expected to exceed \$300,000 All monitoring, collecting and reporting will be accomplished by DEC staff using standard operating funds
<p>CONTACT INFORMATION: Wayne Elliot NYSDEC Region 3 21 South Putt Corners Road, New Paltz, NY 12561 Telephone – (845) 256-3066 Fax – (845) 255-4659 e-mail wpelliot@gw.dec.state.ny.us</p>

<p>STUDY NAME: Fish Inventories of Upper and Middle Delaware River</p>
<p>RESPONSIBLE ORGANIZATIONS: National Park Service (Upper Delaware SRR and Delaware Water Gap NRA) The Academy of Natural Sciences of Philadelphia.</p>
<p>STUDY AREA/REACHES: Delaware River from Hancock, NY downstream to Delaware Water Gap, PA</p>
<p>PURPOSE:</p> <ul style="list-style-type: none"> • The fish inventories have three main objectives: (1) ensure that at least 90% of the fish species in each park are officially documented; (2) provide scientific information about the distribution and abundance of selected species in each park; (3) provide information useful for developing an effective long-term environmental monitoring program for each park.
<p>EXPECTED PRODUCTS:</p> <ul style="list-style-type: none"> • A report describing the statistical (and purposive) sampling plan. • Cataloged voucher specimens. • A database (species list, abundance at each sample site and date). • GIS data layers (“maps”) of all sampling locations at DEWA and Upper Delaware River, with fish species present as attributes. • Final Reports for DEWA and Upper Delaware River.
<p>STATUS:</p> <ul style="list-style-type: none"> • Ongoing: 2005 will be second year of field sampling.
<p>EXPECTED COMPLETION DATE:</p> <ul style="list-style-type: none"> • December, 2006
<p>AMOUNT AND SOURCE OF FUNDS:</p> <ul style="list-style-type: none"> • \$100,000; National Park Service
<p>CONTACT INFORMATION: Rich Horwitz (ANS); Richard Evans (NPS-DEWA); Don Hamilton (NPS-UPDE).</p>

<p>STUDY NAME: Tri-State Watershed Management Plan</p>
<p>RESPONSIBLE ORGANIZATIONS: National Park Service Delaware River Basin Commission</p>
<p>STUDY AREA/REACHES: 8.5 river miles of the main stem Delaware, in the vicinity of Port Jervis, NY between the Upper Delaware Scenic and Recreational River and the Delaware Water Gap National Recreation Area</p>
<p>PURPOSE:</p> <ul style="list-style-type: none"> • Develop an Interstate Watershed Management Plan that would maintain or enhance the existing good water quality in the Middle Delaware River while accommodating smart development and growth.
<p>EXPECTED PRODUCTS:</p> <ul style="list-style-type: none"> • GIS-based water quality model developed by DHI. • Management plan to centralize and enhance treatment of point source pollutants from existing and proposed sewage treatment facilities.
<p>STATUS:</p> <ul style="list-style-type: none"> • Ongoing
<p>EXPECTED COMPLETION DATE:</p> <ul style="list-style-type: none"> • December 2005
<p>AMOUNT AND SOURCE OF FUNDS:</p> <ul style="list-style-type: none"> • NPS share to date is \$125,000.
<p>CONTACT INFORMATION: Patrick Lynch (NPS) 570-296-6952, ext. 30 Ken Najjar (DRBC)</p>