

## GREAT RIVERS OF OHIO RIVER DRAINAGE HABITAT NARRATIVE

### Habitat description

Rivers and streams of the Ohio River drainage include all waters of the lower half of Indiana and a large portion of the northern half of Indiana. Great rivers are those having a drainage area of > 1,999 mi<sup>2</sup>. This includes the Ohio River, the Wabash River upstream to the Mississinewa River, the White River upstream on the West Fork to the Johnson/Morgan county line and on the East Fork to just south of Columbus (Bartholomew County). The entire Ohio River drainage of Indiana culminates where the Wabash River meets the Ohio River in the extreme southwestern tip of Indiana.

### Problems affecting species and habitats

#### Species threats

Respondents ranked the following threats to wildlife in great rivers of Ohio River drainage habitat in Indiana.

Rank	Threats to wildlife in great rivers of Ohio River drainage habitat
1	Invasive/non-native species
2	Habitat loss (feeding/foraging areas)
3	Habitat loss (breeding range)
4	High sensitivity to pollution
5	Bioaccumulation of contaminants
6	Specialized reproductive behavior or low reproductive rates
7	Viable reproductive population size or availability
8	Dependence on other species (mutualism, pollinators)
9	Regulated hunting/fishing pressure (too much)
10	Unintentional take/ direct mortality (e.g., vehicle collisions, power line collisions, by-catch, harvesting equipment, land preparation machinery)
11	Predators (native or domesticated)

Respondents offered no additional threats to wildlife in great rivers of Ohio River drainage habitat in Indiana.

Respondents listed top threats to wildlife in great rivers of Ohio River drainage habitat in Indiana (not ranked):

- Zebra mussels

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- Instream dredging and modification
- Habitat loss
- Pollution
  - Lack of reproductive success as indicated by poor length frequency distribution
  - Possible sensitivity to pollution as indicated by its rarity in the Ohio River reach in Indiana

Technical experts and conservation organizations reviewed the above results and were asked if these were a reasonable representation of the threats to wildlife in great rivers of Ohio river drainage habitat. There were no responses.

### Habitat threats

Respondents ranked threats to great rivers of Ohio River drainage habitat in Indiana:

Rank	Threats to great rivers of Ohio River drainage habitat
1	Stream channelization
2	Impoundment of water/flow regulation
3	Habitat degradation
4 (tie)	Mining/acidification
4 (tie)	Point source pollution (continuing)
5	Nonpoint source pollution (sedimentation and nutrients)
6 (tie)	Agricultural/forestry practices
6 (tie)	Drainage practices (stormwater runoff)
6 (tie)	Invasive/non-native species
6 (tie)	Residual contamination (persistent toxins)
7	Habitat fragmentation
8	Commercial or residential development (sprawl)
9	Counterproductive financial incentives or regulations

Respondents noted another threat to great rivers of Ohio River drainage habitat in Indiana:

- Sand and gravel operations would destroy preferred habitat

Respondents listed top threats to great rivers of Ohio River drainage habitat in Indiana (not ranked):

- Impoundment
- Stream modifications
- Stream channelization
- Dredging
- Non-point source pollution
- Siltation
- Loss of riparian zone

Technical experts and conservation organizations reviewed the above results and were asked if these were a reasonable representation of the threats to great rivers of Ohio River drainage

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habitat. There were no responses.

## **Additional research and survey efforts**

### **Current body of research**

#### Species research

Thirty percent of respondents stated that the current body of science is adequate for wildlife in great rivers of Ohio River drainage habitat in Indiana.

Seventy percent stated that the current body of science is inadequate or non-existent.

Respondents identified the following citations (title, author, date, publisher) that would give the best overview of wildlife in great rivers of Ohio River drainage habitat in Indiana.

Title = Federal Recovery Plan;  
Author = USFWS;  
Date = 1991;  
Publisher = USFWS

Title = Life history and propagation...;  
Author = Jones & Neves;  
Date = 2002;  
Publisher = JNABS

Title = Freshwater mussels of Tennessee;  
Author = Parmalee & Bogan;  
Date = 1998;  
Publisher = U of Tennessee Press

Title = Freshwater mussels of the Midwest;  
Author = Cummings & Mayer;  
Date = 1992;  
Publisher = INHS

Title = Wabash River Catfish Reports;  
Author = Rob Columbo;  
Date = 2002,2003,2004,2005;  
Publisher = SIU/INDFW

Title = numerous INDFW FMR's;  
Author = numerous;  
Date = numerous;  
Publisher = INDFW

Title = annual Ohio River sauger reports;  
Author = ORFMT;  
Date = annually since 1999;  
Publisher = ORFMT

Title = various INDFW FMR's;  
Author = various;  
Date = various;  
Publisher = INDFW

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Technical experts and conservation organizations reviewed the above results and were asked if these were a reasonable representation of the current body of science for wildlife in great rivers of Ohio river drainage habitat. There were no responses.

### Habitat research

All respondents stated that the current body of science is inadequate or non-existent for great rivers of Ohio River drainage habitat in Indiana.

Respondents identified the following citations (title, author, date, publisher) that would give the best overview of great rivers of Ohio River drainage habitat in Indiana.

Title = Federal Recovery Plan;  
Author = USFWS;  
Date = 1991;  
Publisher = USFWS

Title = Naiades of Pennsylvania;  
Author = Ortman;  
Date = 1919;  
Publisher = Carnegie Museum

Title = Freshwater Mollusca of WI;  
Author = Baker;  
Date = 1928;  
Publisher = WI Geol. Nat. Hist. Surv.

Title = Ohio River Mainstem Study;  
Author = USACOE;  
Date = 2000?;  
Publisher = USACOE

Title = Ohio River Mainstem Study;  
Author = USACOE;  
Date = 2000?;  
Publisher = USACOE

Technical experts and conservation organizations reviewed the above results and were asked if these were a reasonable representation of the current body of science for great rivers of Ohio river drainage habitat. There were no responses.

### **Research needs**

#### Species research

Respondents ranked research needs for wildlife in great rivers of Ohio River drainage habitat in Indiana:

Rank	Research needs for wildlife in great rivers of Ohio River drainage habitat
1	Life cycle
2 (tie)	Distribution and abundance

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- 2 (tie) Threats (predators/competition, contamination)
- 3 Limiting factors (food, shelter, water, breeding sites)
- 4 Population health (genetic and physical)
- 5 Relationship/dependence on specific habitats

Respondents noted that research needs were “determining the population limiting factors in the Ohio River” for wildlife in great rivers of Ohio River drainage habitat in Indiana.

Technical experts and conservation organizations reviewed the above results and were asked if these were a reasonable representation of the research needs for wildlife in great rivers of Ohio river drainage habitat. There were no responses.

### Habitat research

Respondents ranked research needs for great rivers of Ohio River drainage habitat in Indiana:

Rank	Research needs for great rivers of Ohio River drainage habitat
1 (tie)	Distribution and abundance (fragmentation)
1 (tie)	Threats (land use change/competition, contamination/global warming)
2	Growth and development of individual components of the habitat
3	Relationship/dependence on specific site conditions

A respondent noted additional research need for great rivers of Ohio River drainage habitat in Indiana:

- Water quality requirements

Technical experts and conservation organizations reviewed the above results and were asked if these were a reasonable representation of the research needs for great rivers of Ohio river drainage habitat. There were no responses.

## **Conservation actions necessary**

### Species actions

Respondents listed these conservation efforts that address threats to wildlife in great rivers of Ohio River drainage habitat in Indiana (not ranked):

- Habitat protection
- Public education to reduce human disturbance
- Limiting contact with pollutants/contaminants
- Population management (hunting, trapping)

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- Regulation of collecting

Respondents noted no other conservation practices for wildlife in great rivers of Ohio River drainage habitat in Indiana.

Respondents recommended these practices for more effective conservation of wildlife in great rivers of Ohio River drainage habitat in Indiana (not ranked):

- Limit instream modifications
- Restore free-flowing systems
- Remove dams whenever possible
- Public education
- Regulation of collecting
- Habitat protection/restoration
- Pollution control

Technical experts and conservation organizations reviewed the above results and were asked if these were a reasonable representation of the practices for more effective conservation of wildlife in great rivers of Ohio river drainage habitat. There were no responses.

### Habitat actions

Respondents ranked conservation efforts by how well they address threats to great rivers of Ohio River drainage habitat in Indiana:

<b>Rank</b>	<b>Conservation efforts for great rivers of Ohio River drainage habitat</b>
1	Pollution reduction
2 (tie)	Habitat protection through regulation
2 (tie)	Protection of adjacent buffer zone
2 (tie)	Habitat protection incentives (financial)
2 (tie)	Land use planning
2 (tie)	Cooperative land management agreements (conservation easements)
2 (tie)	Habitat protection on public lands
2 (tie)	Habitat restoration through regulation
2 (tie)	Habitat restoration on public lands
2 (tie)	Technical assistance
2 (tie)	Corridor development/protection
2 (tie)	Managing water regimes
2 (tie)	Habitat restoration incentives (financial)
2 (tie)	Artificial habitat creation (artificial reefs, nesting platforms)

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Respondents listed no other conservation practices for great rivers of Ohio River drainage habitat in Indiana.

Respondents recommended the following conservation practices for great rivers of Ohio River drainage habitat in Indiana (not ranked):

- Eliminated habitat modifications
  - Instream dredging
  - Channelization
- Restore free-flowing systems
- Install buffer strips and stabilize banks
- Reduce non-point source pollution
- Riparian conservation easements

Technical experts and conservation organizations reviewed the above results and were asked if these were a reasonable representation of the conservation practices for great rivers of Ohio River drainage habitat. There were no responses.

## Proposed plans for monitoring

### Current monitoring

#### Species monitoring

Respondents were aware of the following monitoring efforts by state agencies for wildlife in great rivers of Ohio River drainage habitat in Indiana (not ranked):

- Periodic statewide (less than once a year but still regularly scheduled) monitoring
- Occasional statewide (less than once a year and not regularly scheduled) monitoring
- Regional or local once-a-year monitoring
- Periodic regional or local (less than once a year but still regularly scheduled) monitoring
- Occasional regional or local (less than once a year and not regularly scheduled) monitoring

Respondents were aware of the following monitoring efforts by other organizations for wildlife in great rivers of Ohio River drainage habitat in Indiana (not ranked):

- Statewide once a year monitoring
- Regional or local year-round monitoring
- Regional or local once-a-year monitoring
- Periodic regional or local (less than once a year but still regularly scheduled) monitoring
- Occasional regional or local (less than once a year and not regularly scheduled) monitoring

Respondents ranked monitoring efforts by state agencies based on their importance for wildlife in great rivers of Ohio River drainage habitat in Indiana:

Rank	Monitoring efforts by state agencies for wildlife in great rivers of Ohio River drainage habitat
1	Periodic regional or local (less than once a year but still regularly scheduled) monitoring

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- 2 Occasional regional or local (less than once a year and not regularly scheduled) monitoring
- 3 Regional or local once-a-year monitoring
- 8 Statewide once-a-year monitoring
- 4 Periodic statewide (less than once a year but still regularly scheduled) monitoring
- 5 Occasional statewide (less than once a year and not regularly scheduled) monitoring
- 7 Regional or local year-round monitoring
- 6 Statewide year-round monitoring

Respondents ranked monitoring efforts by other organizations based on their importance for wildlife in great rivers of Ohio River drainage habitat in Indiana:

Rank	Monitoring efforts by other organizations for wildlife in great rivers of Ohio River drainage habitat
1	Occasional regional or local (less than once a year and not regularly scheduled) monitoring
2	Statewide once-a-year monitoring
3 (tie)	Periodic statewide (less than once a year but still regularly scheduled) monitoring
3 (tie)	Regional or local once-a-year monitoring
3 (tie)	Periodic regional or local (less than once a year but still regularly scheduled) monitoring
4	Occasional statewide (less than once a year and not regularly scheduled) monitoring
5	Statewide year-round monitoring
6	Regional or local year-round monitoring

Respondents listed regional or local monitoring by state agencies for wildlife in great rivers of Ohio River drainage habitat in Indiana (not ranked):

- Ohio River, Cannelton Pool (IDFW 2004)
- Wabash River (IDFW 1999)
- White River, West Fork (IDFW 2004)
- White River, East Fork (IDFW 2003)
- White River, Main Stem (IDFW 2004)
- Patoka River (IDFW 1993)
- Occasional stream surveys
- Annual commercial fish harvest monitoring
- Ohio River, Newburgh and McApline Tailwater fall/winter annual monitoring

Respondents listed regional or local monitoring by other organizations for wildlife in great rivers of Ohio River drainage habitat in Indiana (not ranked):

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- Ohio River
- Wabash River
- Ohio River

Respondents listed organizations that monitor wildlife in great rivers of Ohio River drainage habitat in Indiana (not ranked):

- USFWS
- Consultants
- IDNR, DFW
- Electric utilities
- Ball State University
- Purdue University

Respondents considered monitoring techniques for wildlife in great rivers of Ohio River drainage habitat in Indiana as follows:

<b>Monitoring techniques for wildlife in great rivers of Ohio River drainage habitat</b>	<b>Used</b>	<b>Not used but possible with existing technology and data</b>	<b>Not economically feasible</b>
Radio telemetry and tracking	X	X	X
Modeling	X	--	--
Spot mapping	X	X	--
Reporting from harvest, depredation, or unintentional take (road kill, by-catch)	X	X	--
Mark and recapture	X	X	X
Professional survey/census	X	--	--
Volunteer survey/census	X	--	--
Trapping (by any technique)	X	--	--
Representative sites	X	--	--
Probabilistic sites	X	X	--

Respondents noted other monitoring techniques for wildlife in great rivers of Ohio River drainage habitat in Indiana:

- Larval sampling to check for reproduction

Technical experts and conservation organizations reviewed the above results and were asked if these were a reasonable representation of the monitoring techniques for wildlife in great rivers of Ohio River drainage habitat. There were no responses.

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Habitat inventory and assessment

Respondents were aware of the following inventory and assessment efforts by state agencies for great rivers of Ohio River drainage habitat in Indiana (not ranked):

- Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment
- Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment

Respondents were aware of the following inventory and assessment efforts by other organizations for great rivers of Ohio River drainage habitat in Indiana (not ranked):

- Regional or local year-round inventory and assessment
- Regional or local once-a-year inventory and assessment
- Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment
- Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment

Respondents ranked inventory and assessment efforts by state agencies based on their importance for conservation of great rivers of Ohio River drainage habitat in Indiana:

Rank	Inventory and assessment by state agencies for great rivers of Ohio River drainage habitat
1	Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment
2	Statewide once-a-year inventory and assessment
3	Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment
5	Regional or local once-a-year inventory and assessment
4 (tie)	Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment
4 (tie)	Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment
6	Statewide annual inventory and assessment
7	Regional or local year-round inventory and assessment

Respondents ranked inventory and assessment efforts by other organizations based on their importance for conservation of great rivers of Ohio River drainage habitat in Indiana:

Rank	Inventory and assessment by other	Score
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	<b>organizations for great rivers of Ohio River drainage habitat</b>	
1	Periodic regional or local (less than once a year but still regularly scheduled) inventory and assessment	3.88
2 (tie)	Occasional regional or local (less than once a year and not regularly scheduled) inventory and assessment	2.88
2 (tie)	Regional or local once-a-year inventory and assessment	2.88
3 (tie)	Periodic statewide (less than once a year but still regularly scheduled) inventory and assessment	2.63
3 (tie)	Occasional statewide (less than once a year and not regularly scheduled) inventory and assessment	2.63
3 (tie)	Regional or local year-round inventory and assessment	2.63
3 (tie)	Statewide once-a-year inventory and assessment	2.63
4	Statewide year-round inventory and assessment	2.37

Respondents listed regional or local inventory and assessment by state agencies for great rivers of Ohio River drainage habitat in Indiana (not ranked):

- Ohio River
- Wabash River
- White River, West Fork
- White River, East Fork

Respondents listed regional or local inventory and assessment by other organizations agencies for great rivers of Ohio River drainage habitat in Indiana (not ranked):

- Ohio River (USACOE)
- Wabash River
- White River, West Fork
- White River, East Fork

Respondents listed organizations that monitor great rivers of Ohio River drainage habitat in Indiana (not ranked):

- USFWS
- Consultants
- IDNR, DFW
- USACOE (Ohio River)

Respondents considered inventory and assessment techniques for great rivers of Ohio River drainage habitat in Indiana as follows:

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Inventory and assessment techniques for great rivers of Ohio River drainage habitat	Used	Not used but possible with existing technology and data	Not economically feasible
GIS mapping	X	X	X
Aerial photography and analysis	X	X	--
Systematic sampling	X	--	--
Participation in land use programs	X	--	--
Modeling	X	--	--
Voluntary landowner reporting	X	--	--

Respondents listed additional inventory and assessment techniques for great rivers of Ohio River drainage habitat in Indiana:

- QHEI

Technical experts and conservation organizations reviewed the above results and were asked if these were a reasonable representation of the inventory and assessment techniques for great rivers of Ohio River drainage habitat. There were no responses.

### Recommended monitoring

#### Species monitoring

Respondents recommended the following monitoring techniques for effective conservation of wildlife in great rivers of Ohio River drainage habitat in Indiana (not ranked):

- Intensive quantitative sampling of known populations. (Need to understand demography of species. See Strayer & Smith, 2003. AFS Monogram 8)
- Less intensive qualitative sampling of new or not recently surveyed areas. (Need to determine distribution and status of species. See same for protocols.)
- Electrofishing (riverwide and swift water habitats)
- Hoop nets
- Periodic stream surveys
- Fall/winter Ohio River tailwater sampling and occasional stream surveys

Technical experts and conservation organizations reviewed the above results and were asked if these were a reasonable representation of the monitoring techniques for effective conservation of wildlife in great rivers of Ohio river drainage habitat. There were no responses.

#### Habitat inventory and assessment

Respondents recommended the following inventory and assessment techniques for effective conservation of great rivers of Ohio River drainage habitat in Indiana (not ranked):

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- Assess zebra mussel infestations. (Contact P. Morrison, USFWS, Parkersburg, WV)
- QHEI
- Record habitat when the wildlife species is collected during a survey.
- GIS mapping and aerial photography and analysis

Technical experts and conservation organizations reviewed the above results and were asked if these were a reasonable representation of the inventory and assessment techniques for effective conservation of great rivers of Ohio river drainage habitat. There were no responses.