

KETTLE LAKES HABITAT NARRATIVE

Habitat description

Kettle lakes are naturally occurring standing water bodies that were formed by glacial activity.

Problems affecting species and habitats

Species threats

Respondents ranked threats to wildlife in kettle lakes habitat in Indiana:

Rank	Threats to wildlife in kettle lakes habitats
1	Habitat loss (breeding range)
2 (tie)	Habitat loss (feeding/foraging areas)
2 (tie)	Degradation of movement/migration routes (overwintering habitats, nesting and staging sites)
3	Predators (native or domesticated)
4	Invasive/non-native species
4	Dependence on irregular resources (cyclical annual variations) (e.g., food, water, habitat limited due to annual variations in availability)
5 (tie)	Diseases/parasites (of the species itself)
5 (tie)	High sensitivity to pollution
5 (tie)	Bioaccumulation of contaminants
5(tie)	Genetic pollution (hybridization)
6 (tie)	Unintentional take/direct mortality (e.g., vehicle collisions, power line collisions, by-catch, harvesting equipment, land preparation machinery)
6(tie)	Viable reproductive population size or availability
7(tie)	Regulated hunting/fishing pressure (too much)
7(tie)	Large home range requirements

Respondents identified “Disturbance by recreational boating” as an additional threat to wildlife in Kettle lake habitats in Indiana.

Respondents noted top threats to wildlife in kettle lake habitats in Indiana (not ranked):

- Habitat loss due to urbanization
- Habitats lost for breeding, feeding, and foraging
- Loss or degradation of nesting habitat

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- Loss or degradation of brood-rearing and foraging areas
- Degradation of movement/migration routes

Technical experts and conservation organizations reviewed the above results and were asked if these were a reasonable representation of the threats to wildlife kettle lakes habitats. There were no responses.

Habitat threats

Respondents ranked threats to kettle lakes habitat in Indiana:

Rank	Threats to kettle lakes habitats
1	Commercial or residential development (sprawl)
2	Habitat degradation
3	Habitat fragmentation
4	Stream channelization
4	Agriculture/forestry practices
4	Counterproductive financial incentives or regulations
5	Invasive/non-native species
6	Nonpoint source pollution (sedimentation and nutrients)
6	Impoundment of water/flow regulation
7	Residual contamination (persistent toxins)
7	Successional change
7	Point source pollution
8	Drainage practices (stormwater runoff)

Respondents noted no other threats to kettle lakes habitat in Indiana.

Respondents noted top threats to kettle lakes habitat in Indiana (not ranked):

- Habitat fragmentation
- Degradation of aquatic plants and wetlands around lake shorelines.
- Urban Development
- Residential development around lake shorelines
- Commercial and or residential development
- Agricultural Practices

Technical experts and conservation organizations reviewed the above results and were asked if these were a reasonable representation of the threats to kettle lakes habitats. There were no responses.

Additional research and survey efforts

Current body of research

Species research

Respondents were divided equally across three responses, indicating that research about wildlife in kettle lake habitats is adequate, inadequate or nonexistent.

Respondents identified the following citations (title, author, date, publisher) that would give the best overview of wildlife in kettle lake habitats in Indiana.

Title = Ducks, Geese & Swans of North America;
Author = Frank C. Bellrose;
Date = 1976;
Publisher = Stackpole Books

Title = Waterfowl & Wetlands an Intergarted review;
Author = Theodore A. Bookout;
Date = 1979;
Publisher = LaCrosse Printing

Technical experts and conservation organizations reviewed the above results and were asked if these were a reasonable representation of the current body of science of wildlife in kettle lakes habitats. There were no responses.

Habitat research

Two-thirds of respondents indicated that research on kettle lake habitat is inadequate with one-third suggesting that such research is nonexistent.

Respondents identified the following citations (title, author, date, publisher) that would give the best overview of kettle lake habitats in Indiana.

Title = Soil Survey's of Indiana Counties;
Author = U.S. Dept. of Agriculture, SCS;
Date = 1990;
Publisher = U.S. Dept. of Agriculture

Title = Management of Seasonally Flooded Impoundments;
Author = Leigh H. Fredrickson, T. Scott Taylor;
Date = 1982;
Publisher = U.S. Fish and Wildlife Service

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 kettle lakes habitats. There were no responses.

Research needs

Species research

Respondents ranked research needs for wildlife in kettle lakes in Indiana:

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Rank	Research needs for wildlife in kettle lakes habitats
1 (tie)	Limiting factors (food, shelter, water, breeding sites)
1 (tie)	Relationship/dependence on specific habitats
2	Threats (predators/competition, contamination)
3 (tie)	Population health (genetic and physical)
3 (tie)	Distribution and abundance
4	Life cycle

One respondent stated that research was needed on “harvest” and “survival/nest success” for wildlife in kettle lakes 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 kettle lakes habitats. There were no responses.

Habitat research

Respondents indicated the research needs for kettle lakes habitat in Indiana:

Rank	Research needs for kettle lakes habitats
1	Threats (land use change/competition, contamination/global warming)
2	Distribution and abundance (fragmentation)
2	Relationship/dependence on specific site conditions
3	Growth and development of individual components of the habitat
4	Successional changes

Respondents did not list other research needs for kettle lakes 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 kettle lakes habitats. There were no responses.

Conservation actions necessary

Species actions

Respondents indicated how well conservation efforts address the threats to wildlife in kettle lake habitats in Indiana:

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Rank	Conservation efforts for wildlife in kettle lakes habitats
1 (tie)	Habitat protection (use below for details)
1 (tie)	Population management (hunting, trapping)
1 (tie)	Protection of migration routes
2	Food plots
3 (tie)	Native predator control
3 (tie)	Limiting contact with pollutants/contaminants
3 (tie)	Public education to reduce human disturbance
4 (tie)	Regulation of collecting
4 (tie)	Threats reduction
5 (tie)	Exotic/invasive species control
5 (tie)	Disease/parasite management
6	Culling/ selective removal

Respondents listed no other current conservation practices for wildlife in kettle lakes habitat in Indiana.

Respondents recommended the following conservation practices to enhance wildlife in kettle lakes habitat in Indiana (not ranked):

- Habitat protection (without habitat the mallard won't do well)
- Population management (makes use of surplus numbers and regulates take)
- Habitat protection (intensive)
- Reproduction and protection
- Protection of migrating routes (intensive)
- Hen houses
- Habitat conservation
- Buffer zones

Technical experts and conservation organizations reviewed the above results and were asked if these were a reasonable representation of the conservation practices for wildlife in kettle lakes habitats. There were no responses.

Habitat actions

Respondents indicated how well the following conservation efforts address threats to kettle lakes habitat in Indiana:

Rank	Conservation efforts for kettle lakes habitats
1	Habitat protection on public lands
2 (tie)	Habitat protection through regulation
2 (tie)	Habitat restoration on public lands
3 (tie)	Habitat restoration incentives (financial)
3 (tie)	Land use planning

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- 3 (tie) Protection of adjacent buffer zone
- 3 (tie) Cooperative land management agreements (conservation easements)
- 3 (tie) Habitat protection incentives (financial)
- 3 (tie) Habitat restoration through regulation
- 4 (tie) Pollution reduction
- 4 (tie) Technical assistance
 - 5 Managing water regimes
- 6 (tie) Artificial habitat creation (artificial reefs, nesting platforms)
- 6 (tie) Succession control (fire, mowing)
- 6 (tie) Corridor development/protection
- 6 (tie) Restrict public access and disturbance
 - 7 Selective use of functionally equivalent exotic species in place of extirpated natives

Respondents noted no other conservation practices for kettle lakes habitat in Indiana.

Respondents indicated that the following conservation actions are needed in kettle lakes habitat in Indiana (not ranked):

- Habitat protection through regulation (only sure way to protect habitat without public ownership)
- Purchase more public land.
- Habitat protection through regulation, (less intensive) cover a large geographic area
- Habitat Protection through incentives, (intensive), best landowner cooperation
- Landowner programs
- Buffers
- Habitat conservation regulations

Technical experts and conservation organizations reviewed the above results and were asked if these were a reasonable representation of the conservation practices for kettle lakes habitats. There were no responses.

Proposed plans for monitoring

Current monitoring

Species monitoring

Respondents indicated awareness of the following monitoring efforts conducted by state agencies for wildlife in kettle lakes habitat in Indiana (not ranked):

- Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies
- Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies
- Statewide once a year monitoring conducted by state agencies

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- Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies
- Regional or local once a year monitoring conducted by state agencies
- Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies
- Statewide year-round monitoring conducted by state agencies

Respondents indicated awareness of the following monitoring efforts conducted by other organizations for wildlife in kettle lakes habitat in Indiana (not ranked):

- Statewide once-a-year monitoring conducted by other organizations
- Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations
- Regional or local once-a-year monitoring conducted by other organizations
- Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by other organizations

Respondents ranked the importance of monitoring efforts by state agencies for wildlife in kettle lakes habitat in Indiana:

Rank	Monitoring by state agencies for wildlife in kettle lakes habitat
1 (tie)	Statewide year-round monitoring conducted by state agencies
1 (tie)	Statewide once-a-year monitoring conducted by state agencies
1 (tie)	Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by state agencies
1 (tie)	Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by state agencies
2 (tie)	Regional or local once-a-year monitoring conducted by state agencies
2 (tie)	Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by state agencies
3	Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by state agencies

Respondents ranked the importance of monitoring efforts by other organizations for wildlife in kettle lakes habitat in Indiana:

Rank	Monitoring by other organizations for wildlife in kettle lakes habitat
1 (tie)	Occasional statewide (less than once a year and not regularly scheduled) monitoring conducted by other organizations

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- 1 (tie)** Occasional regional or local (less than once a year and not regularly scheduled) monitoring conducted by other organizations
- 2** Statewide once-a-year monitoring conducted by other organizations
- 3 (tie)** Periodic statewide (less than once a year but still regularly scheduled) monitoring conducted by other organizations
- 3 (tie)** Regional or local once-a-year monitoring conducted by other organizations
- 3 (tie)** Periodic regional or local (less than once a year but still regularly scheduled) monitoring conducted by other organizations

Respondents listed the following regional or local monitoring efforts by state agencies for wildlife in kettle lakes habitat in Indiana (not ranked):

- Fish and Wildlife properties in northern Indiana
- Tri-County Fish and Wildlife Area, Division of Fish and Wildlife

Respondents listed regional or local monitoring by other organizations for wildlife in kettle lakes habitat in Indiana (not ranked):

- IDNR Division of Fish and Wildlife properties in northern Indiana
- Natural lakes
- Nature preserves

Organizations that monitor wildlife in kettle lakes habitat in Indiana include (not ranked):

- Audubon Society
- Ducks Unlimited
- Indiana Division of Fish and Wildlife
- Breeding Bird Survey

The following table reflects the opinions of multiple respondents, thus multiple check marks are possible. Additionally, some of these differences may reflect different taxonomic group bias.

Respondents ranked current monitoring techniques for wildlife in kettle lakes habitats in Indiana:

Rank	Monitoring techniques for wildlife in kettle lakes habitat	Used	Not used but possible with existing technology or data
	Radio tracking and telemetry		X
	Modeling	X	

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Driving a survey route	X	
Reporting from harvest, depredation, or unintentional take (road kill, by-catch)	X	
Mark and recapture	X	
Professional survey/census	X	
Volunteer survey/census	X	X
Trapping (by any technique)	X	X

Respondents listed no other monitoring techniques for wildlife in kettle lakes habitat in Indiana.

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 kettle lakes habitats. There were no responses.

Habitat inventory and assessment

One-third of respondents indicated knowledge of inventory and assessment efforts by state agencies for kettle lakes habitat in Indiana (not ranked):

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

Respondents were not aware of other organizations that conduct habitat and inventory assessment efforts for kettle lakes habitat in Indiana.

One-third of respondents considered the following as "very crucial" by state agencies for conservation of kettle lakes habitat in Indiana:

- Statewide once-a-year inventory and assessment

Fifty-percent of respondents consider the following as "somewhat crucial" by state agencies for conservation of kettle lakes 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

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Respondents did not know about monitoring efforts conducted by other organizations for kettle lakes habitat in Indiana.

A respondent listed the following regional or local inventory and assessment by state agencies for kettle lakes habitat in Indiana:

- Natural lakes in northern Indiana

A respondent listed no regional or local inventory and assessment by other organizations for kettle lakes habitat in Indiana.

Respondents listed no organizations other than the IDNR Division of Fish and Wildlife as involved in inventory and assessment for kettle lakes habitat in Indiana.

The following table reflects the opinions of multiple respondents, thus multiple check marks are possible. Additionally, some of these differences may reflect different taxonomic group bias.

Respondents listed current inventory and assessment techniques for kettle lakes habitats in Indiana. (No respondents listed techniques as “frequently used” or “not economically feasible.”)

Rank	Inventory and assessment techniques for kettle lakes habitats	Occasionally used	Not used, but possible with existing technology and data
	GIS mapping	X	X
	Aerial photography and analysis	X	X
	Regulatory information	X	X
	Voluntary landowner reporting	X	X
	Systematic sampling	X	X
	Participation in land use programs	X	X
	Modeling	X	X

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 kettle lakes habitats. There were no responses.

Recommended monitoring

Species monitoring

Respondents recommended the following monitoring techniques for wildlife in kettle lakes habitat in Indiana (not ranked):

- Professional surveys or counts on F&W areas during migration periods (tracks annual migration trends and is index to population levels)

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- Harvest surveys on F&W areas (tracts annual numbers taken)
- Mark/recapture banding (intensive)
- Harvest data collection (less intensive)
- Banding
- Brood surveys

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 kettle lakes habitats. There were no responses.

Habitat inventory and assessment

Respondents recommended the following inventory and assessment techniques for kettle lakes habitat in Indiana (not ranked):

- GIS mapping (electronic data base of current habitat; intensive)
- Aerial photography and analysis (examine changes in habitat; less intensive)
- Spring counts (aerial)

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 kettle lakes habitats. There were no responses.