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CHAPTER VII.

PROPOSED PLAN FOR MONITORING SPECIES OF GREATEST CONSERVATION NEED AND HABITATS



Barn Owl, *Tyto alba*

FISH AND WILDLIFE CONSERVATION AND MANAGEMENT IS INTENDED TO PROVIDE STABLE, SELF-SUSTAINING POPULATIONS OF NATIVE SPECIES.

Therefore, species and habitat monitoring efforts contribute to two important aspects of the planning cycle: the inventory stage that assesses the status of the state's natural resources and the evaluation stage that measures the success of conservation efforts.

SPECIES MONITORING

The DFW has operated under a planned management system for over 30 years and conducts a wide variety of survey and monitoring activities (Table 7-1). The public expects the state to have knowledge of the distribution and relative abundance of fish and wildlife. Federal support for survey and monitoring of game and sport fish species has been established in Indiana since 1937.

Additionally, readily observable bird species have benefited from long standing surveys that provide standardized population trend data. Distribution and abundance surveys for other nongame species have increased in Indiana in the last three decades. Records for SGCN are entered into the Heritage Database, which is maintained by the Division of Nature Preserves (DNP). The Heritage Database represents one of the oldest and most complete repositories of SGCN occurrence data available.

Element five of the Congressional guidelines for the SWAP revision requires that species monitoring needs be identified. A review of current monitoring efforts was an important component in the identification of additional monitoring needs. Specific questions were included in the Species Survey (Appendix O) to determine the level of awareness of species monitoring efforts conducted by the state and other entities. In the CWS Technical Expert Survey, in all species groups, except amphibians, those surveyed were more aware of species monitoring by the state than monitoring by other organizations (Table 7-2). In the recent Species Survey, awareness of species monitoring by the state was greater in all species groups (Table 7-3).

State monitoring efforts are used to determine the status of species, set harvest regulations, and prioritize conservation efforts. Historically, the majority of these surveys have been aimed at game or commercially valuable species. In addition to species status information, collectively, these surveys have provided some insight into habitat and environmental health changes in Indiana. More recently, monitoring efforts conducted or supported by the Nongame and Endangered Wildlife Program (formerly the Wildlife Diversity Section, now the Wildlife Science Unit of the Wildlife Section), have provided population status information for a majority of SGCN. Implementing conservation actions needed to prevent species from declining to the point of being endangered requires early detection and intervention. Therefore, four distinct levels of species monitoring are essential for comprehensive conservation:

1. Monitoring of game, commercial, or common species
2. Monitoring of species in declining or at-risk habitats
3. Monitoring of suspected at-risk species
4. Monitoring of known SGCN

As long as appropriate, the DFW will continue the monitoring efforts in Table 7-1, which are the focus of the SWAP and are directly related to the detection (determining the conservation status of a species) or monitoring of SGCN.

The DFW does not have statutory authority for insects and invertebrates, other than mollusks. A list of rare insects has been developed based on the recommendation of insect experts working in Indiana (Appendix E). As a general trend, rare insects occur in rare habitats. Correspondingly, staff to address the needs of federally endangered insects in Indiana has come from the DNP. In Indiana, the DNP has responsibility for rare plants and plant communities. The DFW works with the DNP to protect and manage rare habitats and the species, including insects that depend upon them. As resources (funds, expertise, etc.) allow, a more comprehensive insect inventory should be pursued.

In response to element five of the Congressional guidelines for the SWAP revision, DFW sought to identify gaps in species monitoring coverage. This included consideration of monitoring technique development. In 2005, only bird and fish survey efforts seemed to have achieved some measure of standardization. Bird monitoring efforts have benefited from the unifying influence of federal control under the Migratory Bird Treaty Act (MBTA). Fish monitoring efforts are often related to game fish management needs or environmental monitoring. Considerable effort has been expended to establish standardized fish sampling and analysis protocols relative to water and environmental quality monitoring. Undoubtedly, the use of fish in environmental monitoring has contributed to a better understanding of species abundance and distribution.

Since 2005, a greater level of standardization of monitoring efforts has been achieved for amphibians, especially frogs as a result of the North American Amphibian Monitoring Program (NAAMP), and mammals, especially summer bat populations as a result of statewide mobile and fixed acoustic bat surveys. In 2005, it was indicated that monitoring efforts for amphibians, especially salamanders, all reptiles, and freshwater mussels needed to be increased. In the 2005 CWS, reptiles were identified as the most under-monitored species group by both the state and non-state agencies (Table 7-2). The awareness of species monitoring has increased for all species groups since 2005 (Table 7-4), except for reptiles. All species monitoring would benefit from standardized efforts that would facilitate inter-state or regional comparisons; standardized protocols that allow comparison of population trends between state, regions and sample areas is desirable. Indiana does participate in national and regional efforts to develop effective, efficient and standardized protocols for species or species groups as identified in Table 7-1.

Table 7-5 provides a list of anticipated survey and monitoring needs, derived from expert comments provided in the Species Survey and from DFW biologists. The degree to which these survey and monitoring efforts are implemented and the scheduled plan for implementation depend upon a variety of factors, including funding and available expertise. In response to new information, regional or

national priorities, or efficient inventory opportunities, this list may be amended to provide for efficient, effective conservation. Given the magnitude of the inventory needs, use of properly trained citizen scientists is an option for certain species. Efforts should be applied to determining techniques and protocols that can be successfully conducted by volunteers provided limited training. Method of data verification and volunteer recruitment and retention also need to be explored. A successful volunteer program is expected to require the full-time attention of one or more volunteer coordinators, provided either by the state or a conservation partner.

Table 7-1. Current species monitoring efforts conducted by the DFW.

Species Group	Survey Name	Schedule	Area
Game Mammals and Game Birds	Archers Index - Beaver, Bobcat, Northern Bobwhite, Coyote, Deer, Fox Squirrel, Gray Fox, Gray Squirrel, Ruffed Grouse, Muskrat, Opossum, rabbit, Raccoon, Red Fox, River Otter, Skunk, and Turkey	Annual	Statewide
	Dove - banding	Annual ¹	Statewide
	Duck - breeding	Annual	Statewide
	Goose - breeding survey	Annual	Statewide
	Landowner survey - similar to the small game license survey below but for the 'unlicensed' sportsperson – also includes Deer, Turkey, Coyote, Crow, and Ruffed Grouse	Biennial	Statewide
	Northern Bobwhite - breeding	Annual	Statewide
	Pheasant - breeding	Annual	Northern Indiana
	Pheasant broods/Winter Sex Ratio	Periodic	Northern Indiana
	Small game license holder survey - Northern Bobwhite, Cottontail Rabbit, Fox Squirrel, Gray Squirrel, Mourning Dove, Pheasant, and Woodcock	Biennial	Statewide
	Turkey - harvest	Annual	Statewide
	Woodcock - breeding	Annual ¹	Statewide
	Wood duck - banding	Annual ¹	Statewide
	Canada Goose - banding	Annual	Statewide

Species Group	Survey Name	Schedule	Area
	Waterfowl - weekly inventory	Annual – August through January	Statewide at select state and federal properties
	Waterfowl - riverine surveys	Annual – November through January	Lower Wabash River and portions of the West Fork White River
	Fur Buyer Survey	Annual	Statewide
	Trapper Survey	Biennial	Statewide
	Citizen Science Trail Cam Survey	Annual	Statewide
	Scent Station Survey	Annual	Southern Indiana
	River Otter Harvest Survey	Annual	Statewide
	River Otter - occurrences	Annual – as reported	Statewide
	Bobcat - occurrences	Annual – as reported	Statewide
	Large Mammal Report Form	Annual	Statewide
	Deer - Mandatory Harvest Check	Annual	Statewide
	Deer - Hunter Survey	Every 3 years	Statewide

Species Group	Survey Name	Schedule	Area
Nongame Birds	Bald Eagle – wintering	Annual	Statewide
	Bald Eagle – nesting*	Annual	Statewide
	Barn Owl*	Periodic (<5 year interval)	Statewide
	Breeding birds – atlas*	20 year cycle	Statewide
	Breeding birds – summer counts*	Annual	Statewide
	Breeding birds – survey*	Annual ¹	Statewide – random routes
	Colonial waterbird survey*	Periodic (<5 year interval)	Statewide
	Least Tern*	Annual	Southwestern Indiana
	Osprey*	Annual	Statewide
	Peregrine Falcon*	Annual	Statewide
	Loggerhead Shrike	Annual	Statewide
	Sandhill Crane*	Annual	Statewide
	Secretive marsh birds*	Annual	Selected properties
Nongame Mammals	Allegheny Woodrat*	Periodic	Southern Indiana
	Archer Index – Badger*	Annual	Statewide
	Badger* - occurrences	Annual – as reported	Statewide
	Franklin’s Ground Squirrel*	Periodic (<10 year interval)	Northwestern Indiana
	Indiana Bat* - winter hibernacula census	Biennial	Caves in southern Indiana
	Summer bat populations*	Annual ¹	Statewide
	Swamp Rabbit*	Periodic (<10 year interval)	Southwestern Indiana

Species Group	Survey Name	Schedule	Area
Amphibians	Anurans - calling frogs and toads*	Annual ¹	Statewide
	Crawfish Frog*	Periodic (< 5 yr interval)	Southern Indiana
	Green Tree Frog*	Periodic (< 5 yr interval)	Southern Indiana (as range expands)
	General Salamander*	Annual	Statewide
	Green Salamander*	Annual	Southern Indiana
	Hellbender*	Annual	Southern Indiana
	Streamside Salamander*	Periodic (< 5 yr interval)	Southeastern Indiana
	Mole Salamander*	Periodic (< 5 yr interval)	Southwestern Indiana
	Spadefoot Toad*	Periodic (< 5 yr interval)	Southern Indiana
Fish	Game and commercially valuable species	Annual	Statewide in selected streams and reservoirs on a rotating schedule
	Glacial Lakes Status and Trends	Annual	Northern Indiana Glacial Lakes – regional stratified random assessment on a rotating schedule
	Largemouth Bass survey	Annual	Statewide in selected streams, lakes, and reservoirs on a rotating schedule
	Percidae sport fish survey	Annual	Statewide where Percidae are stocked
	Moronidae sport fish survey	Annual	Statewide where Moronidae are stocked
	Commercial fish harvest reporting	Annual	Ohio, Wabash, East Fork White, West Fork White, and Patoka rivers
	Paddlefish and Paddlefish roe survey	Annual	Ohio River
	Shovelnose Sturgeon survey	Annual	Wabash River
	Channel Catfish, Blue Catfish, and Flathead Catfish survey	Annual	Big Rivers in Southern Indiana
	Lake sturgeon*	Annual	Big rivers in Southern Indiana
Nongame Fish*	Continuous	Statewide	

Species Group	Survey Name	Schedule	Area
Freshwater Mussels	Freshwater Mussels (focus on former commercial species)*	10-12 year interval	Big rivers in central and southern Indiana
	Freshwater Mussels*	Continuous	Statewide
Reptiles	Box Turtle*	Periodic (< 5 yr interval)	Statewide with emphasis on south central Indiana
	Ornate Box Turtle*	Periodic (< 5 yr interval)	Northwestern and one location southwestern Indiana
	Kirtland Snake*	Annually	Statewide
	Timber Rattlesnake*	Periodic (< 10 yr interval)	South central Indiana
	Cottonmouth*	Periodic (< 5 yr interval)	Southern Indiana
	Wall lizard*	Periodic as reported	Potentially statewide
	General reptile*	Annual	Statewide

* Efforts include SGCN

† Conducted under a national or regional protocol

Table 7-2. Percentage of respondents from the 2005 CWS Technical Expert Survey that were aware of species monitoring efforts by state agencies and other organizations statewide.

Species Group	State Efforts	Other Organization Efforts
Amphibians	12.5	15.6
Birds	28.3	22.2
Fish	30.2	10.1
Mammals	18.5	7.4
Mussels	15.0	12.5
Reptiles	12.5	4.9

Table 7-3. Percentage of respondents from the 2015 SWAP Species Survey that are aware of which agencies and organizations monitor species groups in Indiana.

	Federal agencies (e.g., USDA Forest Service)		State agencies (e.g., Indiana Department of Natural Resources)		Local agencies (e.g., County Parks & Recreation Department)		Non-profit organizations		For-profit entities		Research entities (e.g., universities)		I don't know		Total Responses
	%	N	%	N	%	N	%	N	%	N	%	N	%	N	
Amphibians	29.4	5	82.4	14	0.0	0	5.9	1	0.0	0	70.6	12	0.0	0	17
Birds	53.1	17	84.4	27	3.1	1	28.1	9	3.1	1	18.8	6	0.0	0	32
Fish	4.5	1	90.9	20	4.5	1	0.0	0	0.0	0	36.4	8	0.0	0	22
Mammals	51.5	34	98.5	65	13.6	9	27.3	18	42.4	28	86.4	57	0.0	0	66
Mollusks	0.0	0	81.3	13	6.3	1	0.0	0	0.0	0	12.5	2	12.5	2	16
Reptiles	14.3	1	100.0	7	14.3	1	0.0	0	0.0	0	71.4	5	0.0	0	7
Total	36.3	58	91.3	146	8.1	13	17.5	28	18.1	29	56.3	90	1.3	2	160

Table 7-4. Percentage of respondents from the 2015 SWAP Species Survey that are aware of current monitoring efforts with respect to species groups in Indiana.

Species Group	Yes	No
Amphibians	38.5	61.5
Birds	46.1	53.9
Fish	51.7	48.3
Mammals	62.3	37.7
Mussels	63.0	37.0
Reptiles	12.9	87.1

Table 7-5. Suggested survey, monitoring, survey technique, survey protocol, and database needs for species in Indiana from 2015 SWAP Species Survey.

Species Group	Species	Schedule	Area	Associated Database Needs
Amphibians	Plains leopard frog	Annual	Northern Indiana	Yes
Birds	Migratory stopover sites	Annual	Selected migratory stopover sites	Yes
	Nesting habitat searches	Annual	Selected habitats	Yes – part of Statewide bird DB
	Owls and Nightjars	Annual	Statewide in suitable habitat	Yes – part of Statewide bird DB
	Rails, Bitterns, and shorebirds	Annual	Statewide in appropriate wetland habitat on a regular cycle	Yes – part of Statewide bird DB
	Gallinaceous game birds (spring)	Annual	Statewide (random)	Yes – part of Statewide bird DB
	Bird Sighting Database	Continuous	Statewide	Yes – part of a statewide bird DB
Freshwater Mussels	Freshwater Mussels	Annual	A subset of Indiana's small streams on a 5-10 year rotation	Yes
Insects	General insect survey	Continuous	Selected rare habitats on a regular cycle	Yes
Invertebrates	Cave invertebrates	Continuous	Selected cave systems on a regular cycle	Yes

Species Group	Species	Schedule	Area	Associated Database Needs
Mammals	Bats (summer)	Annual	Portions of the state on a regular cycle	Yes
	Bats (winter)	Annual	Known or suspected bat caves on a regular cycle (except <i>Myotis sodalists</i> caves)	Yes
	Bat Band Database	Continuous	Statewide	Yes
	Small mammals (shrews, mice and voles)	Annual	Statewide - representative habitats, by county on a regular cycle	Yes
	River Otter – Statistical Population Reconstruction	Annual	Statewide	Yes
	Bobcat – Statistical Population Reconstruction	Annual	Statewide	Yes
Reptiles	Massasauga	Annual	Northern Indiana	Yes
	Blandings turtle	Annual	Northern Indiana	Yes
	Spotted turtle	Annual	Northern Indiana	Yes
	Lizards	Annual	Statewide or by county on a regular cycle	Yes – part of statewide reptile DB
	Snakes	Annual	Statewide or by county on a regular cycle	Yes – part of statewide reptile DB
	Turtles	Annual	Statewide or by county on a regular cycle	Yes – part of statewide reptile DB
General surveys	Surveys of SGCN, especially in certain habitats.	Annual	Statewide in appropriate habitats on a regular cycle	Yes – part of the Heritage Database
	General Prey Inventories - insect, small mammals, amphibians, etc.	As needed	Specific study sites	No – include in study report