

2020 Peregrine Falcon Program Report



Photo by Patricia Berube

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Photo by Deb Powers

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Executive Summary

By the 1960s, peregrine falcons nearly disappeared across the country due to the widespread use of the pesticide DDT. A ban on this environmental contaminant, along with species restoration efforts, resulted in a resurgence of peregrine numbers. The species was delisted Federally in 1999, however the Maine breeding population is still considered endangered. To better understand the current population status of peregrines, resources were allocated in 2020 to conduct a statewide survey.

Data collection was a great success thanks to numerous partners who followed a standardized survey protocol and submitted observations into a data management software called NestStory. The 2020 Maine peregrine falcon population consisted of 37 pairs with 29 breeding pairs documented. Of the 29 pairs that attempted to nest, 26 pairs were successful and hatched 62 chicks and produced 49 fledglings (~ > 28 days old), with 25 young observed at the flight stage. The overall productivity rate was 1.32 fledglings per territorial pair. Most pairs were present on cliffs (54%) but also present on buildings (including lighthouses, 22%), quarries (11%) bridges (8%), and previously used osprey nests (5%).

Considering inter-annual variability in breeding activity and changing threats, it is important to continue survey and management efforts to promote population stability within Maine and throughout the Northeast. The Maine Department of Inland Fisheries and Wildlife will pursue management actions in collaboration with our partners including: site specific management, further developing the monitoring network, developing a long-term monitoring and management plan, placing additional nest aids and cameras, pursuing banding opportunities, and consideration of contaminant sampling.

If you have questions, comments, or would like to join our efforts (e.g. participate in standardized surveys, placement of nest trays/boxes, etc.) please contact Erynn Call, erynn.call@maine.gov. Additionally, any observations of peregrine falcons can be reported at [Maine eBird](#). Always feel free to contact the Maine Department of Inland Fisheries and Wildlife at (207) 287-8000 or at maine.gov/ifw.



Photo by Deb Powers

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Background

The peregrine falcon (*Falco peregrinus*; hereafter peregrine) nearly disappeared from the continental United States due to widespread use of the pesticide DDT. The Eastern population was historically rare and considered extirpated by 1964 (Enderson et al. 1995). Following the listing in 1970 as a Federally endangered species, recovery efforts included a ban on DDT and other environmental contaminants, as well as successful captive breeding programs. These efforts led to consideration of species delisting based upon the following criteria: 1) population size and trend, 2) reproductive performance, 3) pesticide residue in eggs, and 4) eggshell thickness. Goals were met associated with each of the four regional recovery plans and the species was subsequently Federally delisted in 1999 (U.S. Fish and Wildlife Service 1999).

Peregrines in Maine are identified as part of the reintroduced breeding population, Tundra subspecies, or American subspecies. The reintroduced breeding peregrines are currently listed as an endangered species in Maine are a genetic mix of the many birds that were part of the captive breeding program. These birds were identified only by species because of the mix of subspecies and races from around the world. In Maine, a total of 144 birds were released from 1984 to 1997. This reintroduced population breeds within the state and often stays close to their breeding territory throughout the year. In contrast, the Tundra subspecies does not breed in Maine but does migrate and travels through in April and May and mid-September through October. This subspecies was Federally delisted in 1994, is not currently State listed, and their numbers continue to increase. The American subspecies was historically found in Maine before they completely disappeared from the state due to DDT.

The recovery of peregrines in Maine and the entire Northeast has been a success; however, they are still listed as an endangered, threatened, or species of special concern in many states along the east coast and continue to benefit from focused monitoring and management. Banding and re-sighting efforts document inter-state movements of this metapopulation (Faccio et al. 2013). Consequently, it's important to think about species recovery across state boundaries. The first post-recovery nesting was documented in 1987, and by 2002 there were 15 breeding pairs. In 2003, U.S. Fish and Wildlife Service (USFWS) initiated the first of five nationwide monitoring efforts as part of the post-delisting monitoring plan (Green 2003). Maine participated in these post-delisting surveys, but logistical challenges limited comprehensive monitoring of eyries.

Monitoring of pairs during the breeding season is key to managing the recovery of peregrines. Challenging access to some nest sites and the overall time required to monitor these sites has resulted in a patchwork of information on Maine's breeding peregrines. Detection of pairs is optimal during territorial displays prior to incubation in March and April; however, access to remote cliff sites can be extremely difficult during late winter. The broader challenge involved with a comprehensive monitoring effort is the time investment. To properly evaluate eyries, multiple, extended visits are necessary (Green 2003). The first visit determines occupancy and requires up to four hours of observation. A second, four-hour visit determines whether the

unoccupied sites are unchanged. Additional visits are made to occupied sites to assess nest success and productivity.

Based on the research objectives, questions, assessments of peregrine status, and survey results, we will develop and facilitate management recommendations intended to directly influence statewide peregrine population levels. These efforts will incorporate long-range strategic planning considerations to attain stable peregrine populations in Maine and contribute to metapopulation stability throughout the Northeast. Results will inform the state management goal of establishing a self-sustaining population of peregrines through understanding their breeding status. These data will both inform current and future conservation and management of peregrines as well as the process of potential species downlisting.

Survey Methods

Contact author for unabridged survey methods and details on all statewide survey sites.

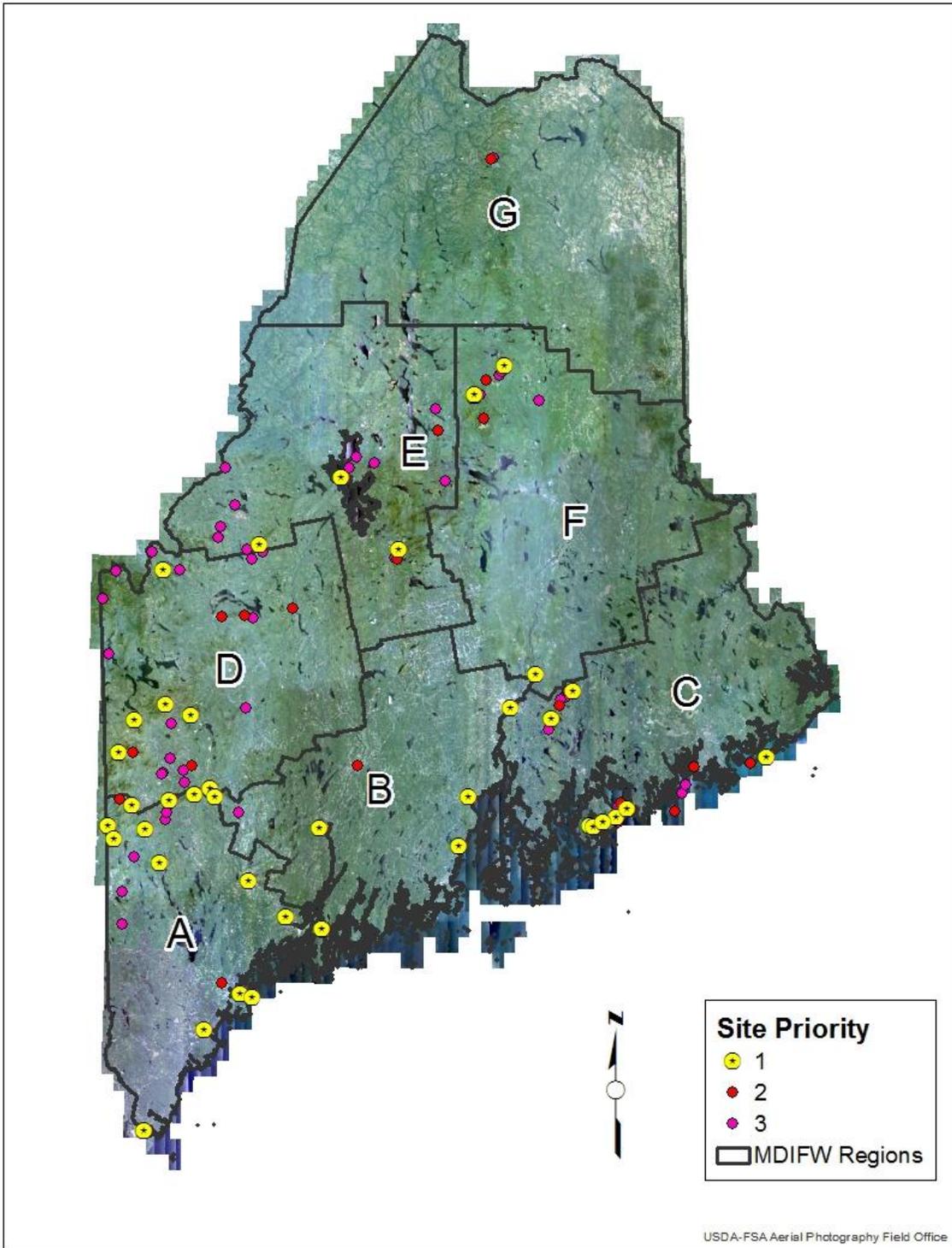
Site selection - Effort focused mostly on known (priority 1) but also included potential (priority 2 and 3) sites (Figure 1, see Appendix 1 for map of sites and MDIFW regions).

Survey frequency - Sites were visited two or more times to determine occupancy, nest success, and productivity (U.S. Fish and Wildlife Service, 2003). The first visit occurred during courtship, egg laying, or early incubation to determine occupancy; a second visit occurred during the early nestling stage to determine the age of the nests, or to check the 'unoccupied' status of territories still in question; and a third visit (or more) was made to occupied territories during the late nestling stage, when young were 28-42 days old to determine nest success and productivity.

If a pair was detected at a site during the first or second survey, a follow-up visit during June or July verified nest success and productivity. Additionally, a follow-up survey within three weeks was conducted if a single adult was observed at the site or if the location of the eyrie was unknown. If young were not detected at sites where a territorial pair was observed prior, a follow-up visit verified nest failure. Additional surveys beyond these minimums occurred depending on surveyor availability and management needs.



Figure 1. Distribution of peregrine falcon survey sites categorized by sampling priority. Priority 1 locations are historical nesting sites where breeding activity has been documented since 1987. Priority 2 and 3 locations have pre-1961 breeding activity or post-1987 resident peregrine observations that may serve as nest sites or are historic Golden Eagle (*Aquila chrysaetos*) sites and serve as potential peregrine nesting habitat.



Survey duration - Surveys were up to four hours as peregrines will often either change incubation duties, cache or deliver food to young within a four-hour span and thus be visible. A minimum of two four-hour observation periods separated by three weeks were necessary to assume a site was unoccupied. A combination of smaller observation periods was not enough to infer an absence of resident peregrine(s) with much confidence.

The survey was four hours if:

- 1) no birds were observed
- 2) a single bird was observed
- 3) location of eyrie was unknown during the incubation or fledgling phase, (~after April 15)
- 4) presence of nestlings/fledglings not known (~after May 15)

The survey was less than four hours if:

- 1) pair observed during courtship phase (~Mar 15 – April 15), perched conspicuously or copulating (i.e. clearly not tending a nest)
- 2) presence of nestlings/fledglings is known (~after May 15)

Survey timing - Timing of initial surveys at eyries varied depending on accessibility but generally occurred between mid-March through May and continued through July. In northern New England, peregrine falcons generally occupy breeding sites and initiate courtship and territorial defense behaviors beginning in early March, although these behaviors are often delayed in inexperienced birds into April and early May. The optimal time of year to conduct surveys to detect presence at breeding sites is from late March through late April, when pairs are in courtship and before secretive incubation behavior begins. Variation in timing occurs, however in general the following timeframes apply:

Territory occupancy/courtship: Mar 15-Apr 15

Incubation: Apr 15-May 15, *low visibility/detection*

Hatch: May 15-Jun 15, *high detection but failed nesting attempts can easily be missed*

Fledging: Jun 15-Jul 15, *high detection but difficult to confirm occupancy at inactive/failed sites*

Call-broadcast - Observers had the option of broadcasting a peregrine call (i.e. call-broadcast) using a speaker, as this has been found to shorten the time necessary to detect breeding pairs (Barnes et al. 2012). The call-broadcast approach was found to be equally effective throughout the day and most effective earlier in the breeding season (Barnes et al. 2012). Success of call-broadcast in soliciting a territorial peregrine response has been documented between 0.7 and over 1.5 km from the eyrie (Ambrose et al. 2014 and Barnes et al. 2012 respectively).

Data collection and submission - Data was collected using a standard survey form during each visit and an eyrie record form, which described the physical site characteristics, was completed once per season. Data could be submitted either by email or observers had an option to enter their data via an online software program called NestStory. This latter option facilitated consistent data collection and reporting, real-time information sharing, and thus significantly optimized efficiency and survey effort.

Nesting Season Summary

Survey results - The 2020 Maine peregrine falcon population consisted of 37 known pairs, with 29 breeding pairs documented (evidence indicates that eggs were laid, incubation, or young were produced) and two territories occupied by a single adult (Table 1, page 10 & 11). Of the 29 pairs that attempted to nest, 26 pairs were successful and hatched 62 chicks and produced 49 fledglings (~ > 28 days old), with 25 young observed at the flight stage (fledged). The overall productivity rate was 1.32 fledglings per territorial pair.

Of the 50 Priority 1 sites (high sampling priority due to recent breeding history or pair presence), 47 were monitored in 2020 and 39 (83%) were found to be occupied (one or more peregrines observed), and 37 (79%) by territorial pairs. Nine sites were monitored (varying durations) and suspected to be unoccupied. Two sites were sampled sufficiently to define as unoccupied (e.g. two four-hour surveys separated by three weeks). Most pairs were present on cliffs (54%), but also present on buildings (including lighthouses, 22%), quarries (11%), bridges (8%), and previously used osprey nests (5%). There were five sites where pairs were documented in 2019 and not in 2020 (Table 2). The first reported pairs were observed on March 11 by Rich Nichols at their nest site in Belfast and by Bik Wheeler at the Precipice in Acadia National Park.

Table 2. Pairs present in 2019 and not documented in 2020.

Site #	Site Name	Town	IFW Region	2019 Pairs	2020 Status
2	C Bluff Mtn	C Surplus	D	2	no survey
15	Rumford Mill	Rumford	D	2	no birds
16	Bald Mtn	Woodstock	A	2	no birds
46	Brimstone Mtn	Twp D	D	2	single
58A	Sappi Paper Mill	Westbrook	A	2	no birds

Survey effort – Additional efforts were placed on recruiting surveyors via social media and other connections. This effort, combined with the contributions of our existing dedicated and experienced partners led to an impressive and consistently documented survey results. A total of 287 surveys were conducted, with 369 hours of effort, and 72 sites visited between March 9 and August 7. Three Priority 1 sites were not surveyed: C Bluff Mountain (#2), Tumbledown Dick Mountain - Peru (#38), and Lord Mountain (#48).

Weather conditions – March was unseasonably warm. Unseasonably cold temperatures developed in mid-April and a snowstorm dumping more than 10” of heavy, wet snow caused wide-spread power outages and some challenges, we presume, for nesting peregrines as well. Conditions changed to warm/dry though early summer. Into summer, Maine experienced drought and a record number of days without rain. In June through August, the average temperature was the [3rd warmest on record for the 125-year period beginning 1895](#). These extreme weather conditions can result in nest failure and/or re-nesting attempts.

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Table 1. Site-specific results of peregrine falcon monitoring in Maine, 2020.

Site #	Site Name	IFW Region	Priority	Site Status	# Chicks	First Survey Date	Last Survey Date	Total effort (min)	# Surveys
005	Ripogenus Dam	E	2	none	0	8/7	8/7	120	1
006	Mt Kineo	E	1	young	4	4/7	6/23	260	3
007	Wassataquoik Mtn	F	1	fledged	1	7/6	7/6	10	1
009	Horse Mtn	F	1	young	1	4/15	7/2	300	2
012	Pine Mtn	A	1	fledged	2	4/7	7/2	600	7
013	Buck's Ledge	A	1	none	0	4/15	4/15	135	1
014	Tumbledown Dick Mtn - Gilead	D	2	none	0	5/4	5/4	60	1
015	Rumford Mill	D	1	none	0	4/8	6/4	357	4
016	Bald Mtn	A	1	none	0	4/22	4/22	105	1
017	Mt Megunticook	B	1	pair	0	3/18	6/16	315	3
018	Eagle Bluff	C	1	young	3	5/11	6/15	190	2
019	Fletcher Bluff	C	2	pair	0	6/21	7/1	340	2
020	Half Mile Pond	C	1	. ^a	0	4/15	6/19	746	6
021	Eagle Bluff	C	2	none	0	5/28	5/28	200	1
022	The Precipice	C	1	pair	0	4/28	8/6	1455	9
024	Beech Cliff	C	1	none	0	4/7	6/5	480	2
025	Valley Cove	C	1	young	3	3/9	6/9	490	3
027	Jordan's Delight	C	3	young	1	6/19	6/19	60	1
028	Tumbledown Dick Head	C	2	none	0	4/7	4/30	480	2
029	The Brothers	C	2	none	0	3/25	5/6	490	2
030	Grafton Notch	D	1	young	1 ^b	4/25	6/13	210	3
031	Tumbledown Mtn	D	1	pair	0	5/8	6/10	425	2
033	Borestone Mtn Summit	E	2	none	0	6/9	6/9	120	1
034	Little Spencer Mtn	E	3	none	0	6/1	6/1	120	1
035	East Royce Mtn	A	1	fledged	4	5/11	7/3	400	4
036	Carleton Bridge Rte 1	A & B	2	none	0	3/10	3/10	240	1
039	Shutdown Mtn	E	1	none	0	4/29	7/2	585	3
041	Rattlesnake Mtn	A	1	none	0	5/4	5/4	200	1
041B	Blueberry Mtn	A	3	none	0	5/4	5/4	200	1
042	Ragged Jack Mtn	D	1	pair	0	4/16	4/16	75	1
043	Barren Mtn	E	1	pair	0	4/21	7/2	697	6
044	Jordan Pond	C	1	fledged	3	3/21	7/15	680	3
045	Squaredock Mtn	A	1	fledged	4	4/7	7/5	250	5
046	Brimstone Mtn	D	1	single	0	4/16	6/17	280	3
049	Ironbound Island	C	1	young	2	4/8	6/12	165	2
050	Big Libby Island	C	1	none	0	4/29	5/15	480	2
051	Bath Iron Works	A	1	young	2	4/9	6/23	110	5
052	Casco Bay Bridge	A	1	young	1	3/18	6/23	375	8

^aPair counted at nearby site 19, Fletcher Bluff.

^bBegging calls heard, no visual.

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Table 1 continued. Site-specific results of peregrine falcon monitoring in Maine, 2020.

Site #	Site Name	IFW Region	Priority	Site Status	# Chicks	First Survey Date	Last Survey Date	Total effort (min)	# Surveys
053	Piscataqua River Bridge	A	1	nest loss	0	3/9	6/10	1035	7
055	Bear Mtn	A	1	young	2	4/15	5/15	245	3
056	Pejepscot Quarry	A	1	young	1	4/15	5/14	375	3
057A	Franco Center	A	1	fledged	2	4/8	7/10	1156	19
057B	Basilica	A	2	none	0	4/9	4/9	30	1
058A	Sappi Paper Mill	A	1	none	0	3/18	7/9	115	4
058B	Westbrook Quarry	A	1	single	0	3/25	5/20	250	5
059A	Granite Hill Quarry	B	1	young	2	3/26	6/10	210	3
060	395 Bridge	C & B	1	young	4	3/13	6/30	165	11
061	Old Town Mill	F	1	pair	0	3/22	6/27	178	4
062	Old Scott Paper Mill	B	1	fledged	2	4/12	8/4	603	7
063A	Passag. Bridge	B	2	none	0	3/15	4/6	150	2
063B	Belfast Quarry	B	1	young	4	3/11	6/15	365	13
064	Indian Stream Mtn	D	1	young	2	4/7	6/5	360	3
065	Ram Island Ledge Lighthouse	A	1	fledged	1	6/14	7/4	115	3
066B	Saint Andres	A	1	young	4	6/6	7/8	1234	15
067	Transm. line tower	B	1	nest loss	0	3/25	6/15	257	8
068	Bold Coast	C	2	none	0	5/21	5/21	254	1
069	Dragon Fields Quarry	A	1	nest loss	0	3/21	6/15	560	10
073	Mosquito Mtn	B	2	none	0	3/25	3/25	64	1
077	Ledge Ridge	D	2	none	0	6/10	6/10	180	1
081	Parks Pond Bluff	C	2	none	0	5/19	5/19	125	1
086	SAPPI Mill: Kenn. River	D	2	none	0	4/19	5/16	105	2
091	Big Hill	C	3	none	0	6/1	6/1	60	1
099	Bear Mtn: Little Bear Pond	B	3	none	0	4/29	4/29	60	1
109	Little Peaked Mtn	C	3	none	0	5/20	5/20	120	1
110	Peaked Mtn	C	3	none	0	5/20	5/20	120	1
113	Little Kineo Mtn	E	3	none	0	5/28	5/28	60	1
117	Soubunge Mtn	E	3	none	0	5/5	5/5	150	1
130	Dragon Cement	B	1	young	3	4/20	5/21	38	10
131	Deer Isle Bridge	C	2	none	0	4/8	4/8	130	1
132	Lincoln Mill	F	1	none	0	3/27	6/2	222	3
136	Madison Mill	D	3	young	3	4/19	6/8	231	6
141	Old Millinocket Mill	F	3	none	0	5/5	5/5	30	1

Banding, Band Resighting, and Recovery— When possible, adult or young peregrines are fitted with a United States Geological Survey (USGS) leg band etched with a unique nine-digit number and a bi-colored band with a unique series of colors, letters, and numbers. In the Northeast, peregrines are banded with the colors black over green. Resighting of leg bands is often accomplished using a spotting scope or photographs, but information can also be collected if a bird is found injured or a carcass is collected. These resightings allow biologists to distinguish individuals and to verify the origins and history of the falcon. In 2020, two adult peregrines were banded, one color banded juvenile was resighted, and one adult male peregrine was found injured with a wing laceration on March 21 in Biddeford (see photo to the right). [Avian Haven](#) attempted to mend the wing but unfortunately the bird was euthanized on April 29.



Given challenges with Covid-19, banding was limited, however we hope to pursue opportunities as they arise in the future. In 2020, in collaboration with USDA Wildlife Services, two peregrines were captured and banded at the Bangor International Airport (BIA) as part of procedures to manage avian and aircraft collision risks.

- An adult male bird was affixed with a silver Federal and color band (2206-71774, BP/00). It was released near the nest in Bangor/Brewer but unfortunately collided with a plane on October 19 and was transported to Avian Haven for euthanasia.
- An adult female was captured on July 31 with a silver Federal band already on (1947-33411). By referencing records, we determined that she had been captured at BIA and banded on September 19, 2018 and released at Fry

- Mountain (not released near the local nest site because it was outside of the breeding season). On July 31, 2020 she was affixed with a color band (97/U) and released within view of the Bangor/Brewer nest (see photo). We would expect that she was the adult female that tended that active nest, however, later review of game camera imagery (courtesy of MDOT Justin Sweitzer and Eric Ham, see “Nest cameras” section below) did NOT show a female with a silver leg band at the nest. This hints at potential adult peregrines in the Bangor/Brewer area during the breeding season that are not associated with the known nest.

Matt Ewing, USDA APHIS Wildlife Services Biologist

In terms of resightings of color banded birds, two peregrines were observed in 2020. Trish Berube spotted a female (2206-71771, 49/U) on April 25 in Lewiston. This bird was banded at Valley Cove in Acadia National Park on 5/31/18. You can read a couple great articles regarding this bird [here](#) and [here](#). Deb Powers observed a young male (1266-02047, 08/CB) on September 13 in South Berwick. This bird's story is quite interesting! It was banded at the Gillis Bridge in Newburyport, MA on June 3, rescued from the Merrimack River on June 21, and observed at Parker River National Wildlife Refuge, (MA) on Aug. 5. Both of its parents are banded, and it is one of three chicks that were all banded. The nest site is monitored by a [camera](#) which takes photos every 15 minutes and facilitates review of photos back in time from the beginning of the nesting season to when the birds left the nest and fledged. You can read more about the Gillis Bridge Wildlife cam [here](#), the story of their successful fledging [here](#), and the rescue [here](#).



Peregrine with color band 08/CB was banded on 6/3 at the Gillis Bridge in Newburyport, MA (left) and monitored by a nest web cam (right), was resighted in ME on 9/13. Photos by David Paulson, MASSDOT, MASSWILDLIFE.

Nest aids – Artificial nest structures greatly improve urban nesting success by providing a safe place for peregrines to lay their eggs. Urban peregrines often lay eggs on cement or other hard surfaces which become too hot, cold, or wet. Nest boxes or trays contain a layer of gravel, mimicking the natural cliff habitat where temperature and moisture are better regulated to improve hatching success. Nest aids can be placed on buildings, bridges, or other structures. Peregrines are helpful in that they keep pigeons and their droppings at bay.



Photo by [Peter Green](#)

The Maine Department of Transportation (MDOT) and MDIFW continue to collaborate on peregrine nest structures. In 2020, a new nest box was placed on the Casco Bay Bridge to replace the older nest tray. A broken peregrine egg shell was found in the tray in 2019, so it was thought a box might provide more shelter and lead to better success.

In addition to the Casco Bay Bridge, MDOT has worked at other locations on behalf of nesting peregrines. A nest tray was placed prior to the 2020 nesting season in Belfast at the Passagassawaukeag bridge. A nest box was moved to new location at the Piscataqua River bridge between Kittery, Maine and Portsmouth, New Hampshire prior to the nest season in 2019. A tray placed by MDOT in 2016 at the I-395 bridge in Brewer/Bangor has led to a dramatic change in nest success. The pair experienced four years of failure prior to the nest tray and then consistent success in the subsequent years with 14 young fledged since the tray was installed, including four in 2020.

Nest cameras – Cameras provide valuable information on nesting activity, timing, and success. Thanks to efforts of MDOT, two nest sites were monitored; Casco Bay Bridge and the I-395 Bridge in Bangor/Brewer. A cellular game camera was placed at the Casco Bay Bridge nest to monitor and pinpoint timing for banding the young as they were not visible from any other location. Unfortunately, the pair did not use the nest box and nested at another site on the bridge where it was too risky for banding (the chick could have easily ended up in the river if it was startled when approached by biologists for banding). The I-395 site was monitored by game cameras that were collected after the nesting season. Both video clips and photos documented the incubation through to fledgling of the four chicks. We hope to expand the use of cameras whenever there are opportunities in the future.



I-395 Bridge, Bangor/Brewer, photos by MDOT

Management Recommendations

The breeding population of peregrine falcons in Maine is listed as state endangered, with 37 pairs and productivity of 1.32 fledglings per territorial pair documented in 2020. Moving forward, the Maine Peregrine Program will pursue the following initiatives which are made possible through many successful collaborations and partnerships with Federal, State, private and dedicated individuals. To promote population stability within Maine and throughout the Northeast, we recommend the following:

Develop a conservation plan -

Goal and content - Our goal is to secure stable statewide peregrine populations in Maine and regionally through development and implementation of a long-range strategic plan for monitoring and management. This plan will outline population recovery metrics (e.g. productivity, nest success, number of pairs, number of fledglings), future monitoring efforts (e.g. survey methodology, site selection [consider the tradeoffs of monitoring historically active eyries with exploring new locations to document population expansion], inter- and intra-annual survey frequency), strength of inference, management actions that will directly address and influence statewide recovery goals, and species listing recommendations and thresholds for future actions (i.e. downlisting, delisting, relisting).

Knowledge sharing - A series of questions were developed and sent out to peregrine biologists along the East Coast states and followed up with conversations. This information will help us understand how other states are approaching peregrine conservation and management as well as bolster future opportunities for professional collaborations. Most states are annually monitoring and banding peregrines (Table 3). [Pennsylvania](#) and [Vermont](#) have peregrine plans and New York’s is pending review.

Table 3. Summary of peregrine listing status and management along the East Coast.

State	Species Status	Monitoring Frequency	Banding
CT	Threatened	Annual	Annual
DE	Not listed	None	None
GA	Special concern	Intermittent	Limited
ME	Endangered	TBD*	Limited*
MA	Special concern	Annual	Annual
NC	Endangered	Annual	Annual
NH	Threatened	Annual	Annual
NJ	Endangered	Annual	Annual
NY	Endangered	Annual	Annual
PA	Threatened	Annual	Annual
VA	Threatened	Annual	Annual
VT	Special concern	Annual	None

*Dependent on conservation plan.



Illustration courtesy of Michael Boardman

Data collection - To assure the strategic plan is based upon recent information across both urban and cliff locations, the objectives are to collect data: 1) over a period of three consecutive years (i.e. 2019 – 2021) to address interannual variation (pairs can move from one eyrie to another between years and weather patterns can significantly affect productivity in a particular year), 2) in a more deliberate and comprehensive approach using a formalized survey protocol initiated in 2019, and 3) increasing effort through recruitment/hiring of surveyors.

Breeding database - Another part of gathering information to inform and develop the conservation plan is compiling all the state breeding peregrine monitoring data into a single, complete database from 1985 through to the present. In collaboration with Acadia National Park, databases and archived files will be reviewed and compiled.

Nest Monitoring – Focused state-wide monitoring was initiated in 2019 and will continue through a third year in 2021. The conservation plan described above will be completed in 2021 and implemented in 2022 with a specific framework for future monitoring efforts. The three years of monitoring will help inform the development of the plan.

Monitoring network – Continue to gain support from citizens and private landowners/companies to monitor and report breeding peregrines across urban and cliff areas. Expand awareness of novel habitats such as quarries in proximity to water, lighthouses, previously used osprey nests/transmission towers, in addition to more well-known habitats such as tall buildings and cliffs. Provide the following contact information to the public:

Please report observations of peregrine falcons at [Maine eBird](#) or consider getting involved in the [Maine Bird Atlas](#). Contact the Maine Department of Inland Fisheries and Wildlife Peregrine Program coordinator, Erynn Call, to get involved with standardized surveys (erynn.call@maine.gov).

Nest data management – MDIFW worked with [The Little Egg Foundation](#), a nonprofit that focuses on providing support for wildlife managers. One of their efforts is the development of a software program called [NestStory](#) which provides a platform for citizen scientists to enter their data and organizes it all to make managing statewide survey efforts much easier for wildlife biologists. NestStory created huge efficiencies allowing for more time spent in the field instead of at a desk. The framework can be customized, and any questions or issues are addressed nearly immediately. NestStory provides many aspects of what is needed to run a statewide survey, for example:

- All statewide peregrine site information, including descriptions for accessing viewing and mapping, was uploaded to NestStory and accessible to surveyors.
- Each surveyor receives a login and password and can enter, view, proof and correct their data as well as documenting survey and data entry hours used as Federal matching. This can be done in the field on a mobile device or on a pc.
- The project lead can access the statewide, interactive map to track site status (unchecked, unoccupied, occupied, nesting) as well as utilize various reports and customizable data download options to streamline project management.

Site management – Each site has its own unique needs and challenges. We will continue to expand partnerships and consider opportunities for improvements.

Urban management - At urban locations, management may include working with private landowners/companies to: 1) improve sighting reports to identify presence of pair, fledglings and/or location of eyrie, 2) provide locations to view birds during surveys, 3) consider nest aids or cameras wherever the opportunity may arise to improve monitoring efficiency and outreach, and 4) consider if there are opportunities to time construction and maintenance activities, thus limiting disturbance to nesting peregrines and in some cases, ensuring safety of staff.

Nest trays and boxes can dramatically improve nest success where pairs are present and chronically unproductive. We will work with partners to place nest aids where appropriate. Generally, placement considerations include:

- Prioritize where birds are active (whitewash/droppings or prey remains (bones and feathers from small birds))
- Consider rooftops, window inset, railings, office buildings, apartments, industrial towers, water towers, transmission towers, and bridges.
- Prioritize an area with minimal direct disturbance and access to the box for banding of young and cleaning in winter.
- Face north through to the east.
- Prioritize areas above 80 – 100 ft.
- Provide perches and room for young to walk and stretch wings.
- Avoid hazards such as electrical lines or areas directly over water.
- Place a camera to document nesting activity if possible.
- Tray dimensions are ~ 34”L X 22”W, box 22” H, dog igloo 48.5”L X 47”W X 37”H.
- Make sure those in the vicinity of the nest structure are aware of how to respond if an injured bird is found.

Cliff management - At remote locations, site management can sometimes include posting educational signs (Figure 2) or trail closures of high use areas (e.g. Acadia National Park) or education of outdoor enthusiasts as to 1) limiting disturbance by maintaining a distance buffer where birds are not agitated, and 2) how to report sightings of peregrines.

Recommendations previously developed by the MDIFW Endangered Species Program are also important to promote (MDIFW 2003):

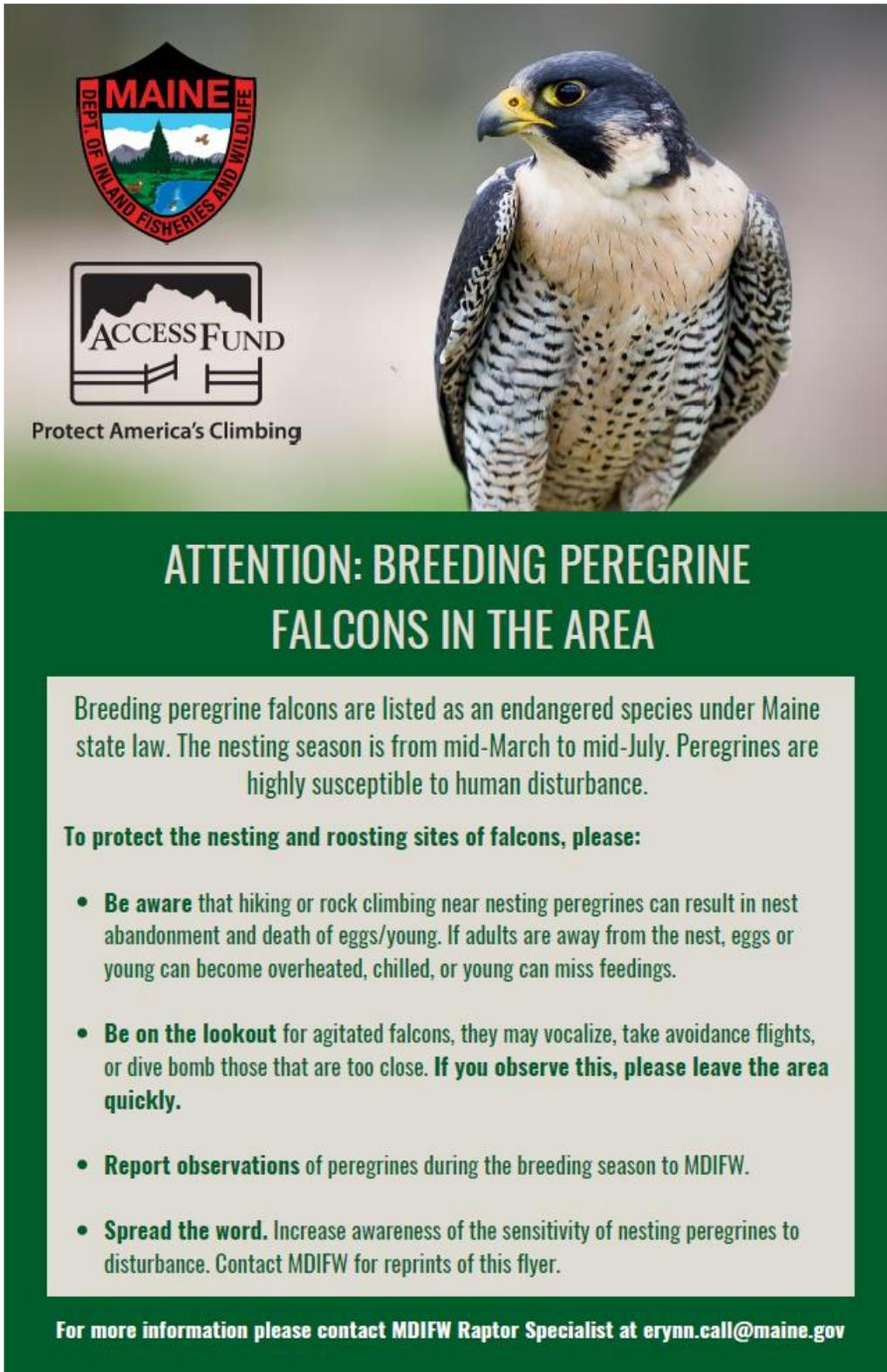
- Prior to land development near peregrine falcon eyries, consult with a biologist from MDIFW to assist with planning.
- Use voluntary agreements, conservation easements, conservation tax abatements and incentives, and acquisition to protect important habitat for threatened and endangered species.

- Prohibit climbing on the cliff and hiking near the cliff rim if activity causes aggressive response from peregrines during the nesting season (March 15 to August 15). Falcons are especially disturbed by nearby activity on the cliff or on trails that are line-of-sight from the nest or perches. Where falcon nests are already established in proximity to humans, these recommendations can be relaxed, unless the birds show evidence of disturbance from human activity.
- Maintain trail closures until five weeks after the last bird has fledged (usually late July to mid-August).
- Avoid construction of permanent roads within 660 feet of a known peregrine site.
- Avoid logging within ¼ mile of an active eyrie during the nesting season.
- Aircraft should not approach closer than 1,500 feet above a nest. Closer approaches may cause peregrines to attack planes or may cause a frantic departure from the nest. Falcons startled from the eyrie have been known to damage eggs or injure nestlings.
- Route powerlines and other wires away from eyries to avoid collisions and electrocution hazards.
- Avoid applications of pesticides around occupied eyries during the breeding season.
- Wetlands, especially intertidal mudflats, estuaries, and coastal marshes, are key feeding areas. Protect wetlands used regularly by peregrine falcons at any time of the year from filling, development, or other disturbances that could alter prey abundance and habitat quality
- Maintain large trees and snags in areas where peregrines nest and feed. These perches are important for roosting and hunting.

Banding— The resighting of banded birds improves our understanding of movement, dispersal, distribution, survival, ancestry, and adaptability to changing environments. While the number of peregrines banded may currently be minimal, we may consider expanding efforts as opportunities arise.

Contaminant sampling— Chemical contaminants are important to monitor as they can have population-level impacts on apex avian species (Shore and Taggart 2019). Peregrines and other apex predators tend to accumulate pollutants through the food web. Despite the ban on DDT, which led to the peregrine resurgence, there is still a chemical cocktail of contaminants that are persistent in the environment – which means they don't break down and can accumulate over time. These include perfluoroalkyl substances found in food packaging, household cleaners, stain- and water-repellent fabrics, and nonstick cookware (PFAS, Vorkamp et al. 2019), mercury (THg, Barnes et al. 2019), brominated flame retardants (PBDE, Fernie et al. 2017), and organochlorine pesticides (Vorkamp et al. 2017). Gaining insight into the presence of these chemicals not only has implications for peregrine populations but also as long-lived apex predators; predatory birds represent a sentinel species for human health (Heys et al. 2017). We hope to further investigate and consider opportunities to sample contaminants in Maine breeding peregrines.

Figure 2. Trail sign developed by MDIFW in 2020 to warn outdoor enthusiasts of a potential nesting peregrine in the area.



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Photo by [Peter Green](#)

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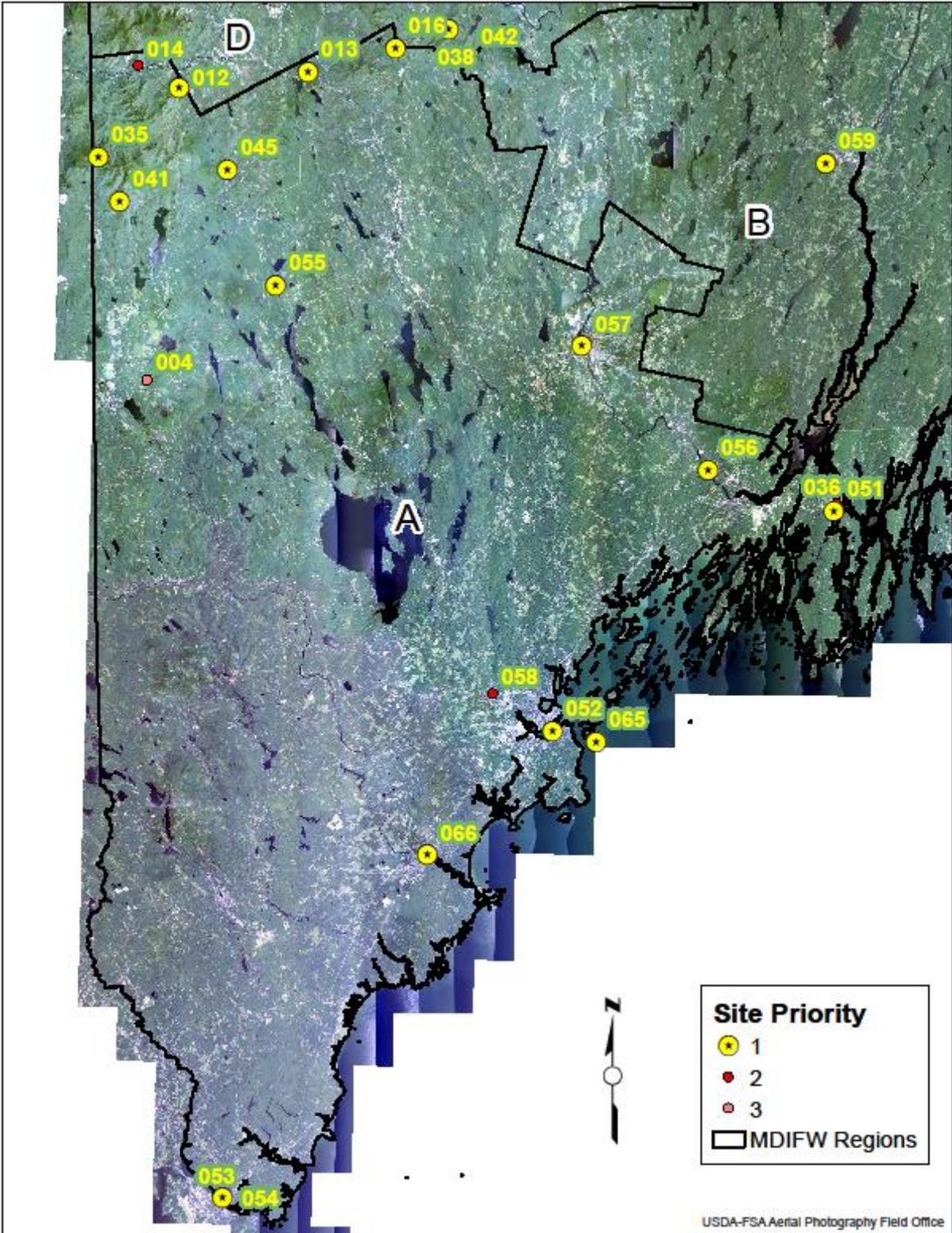
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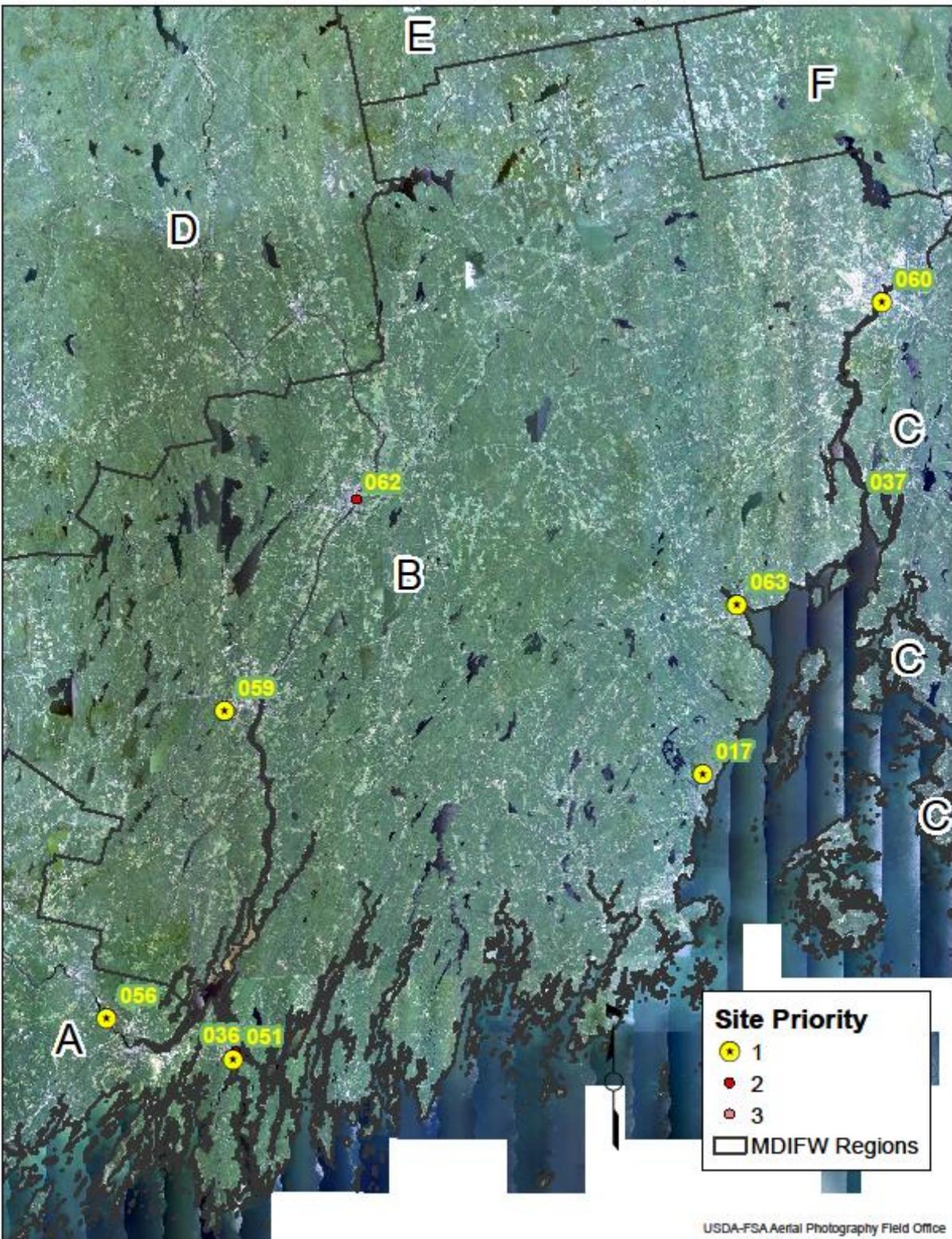
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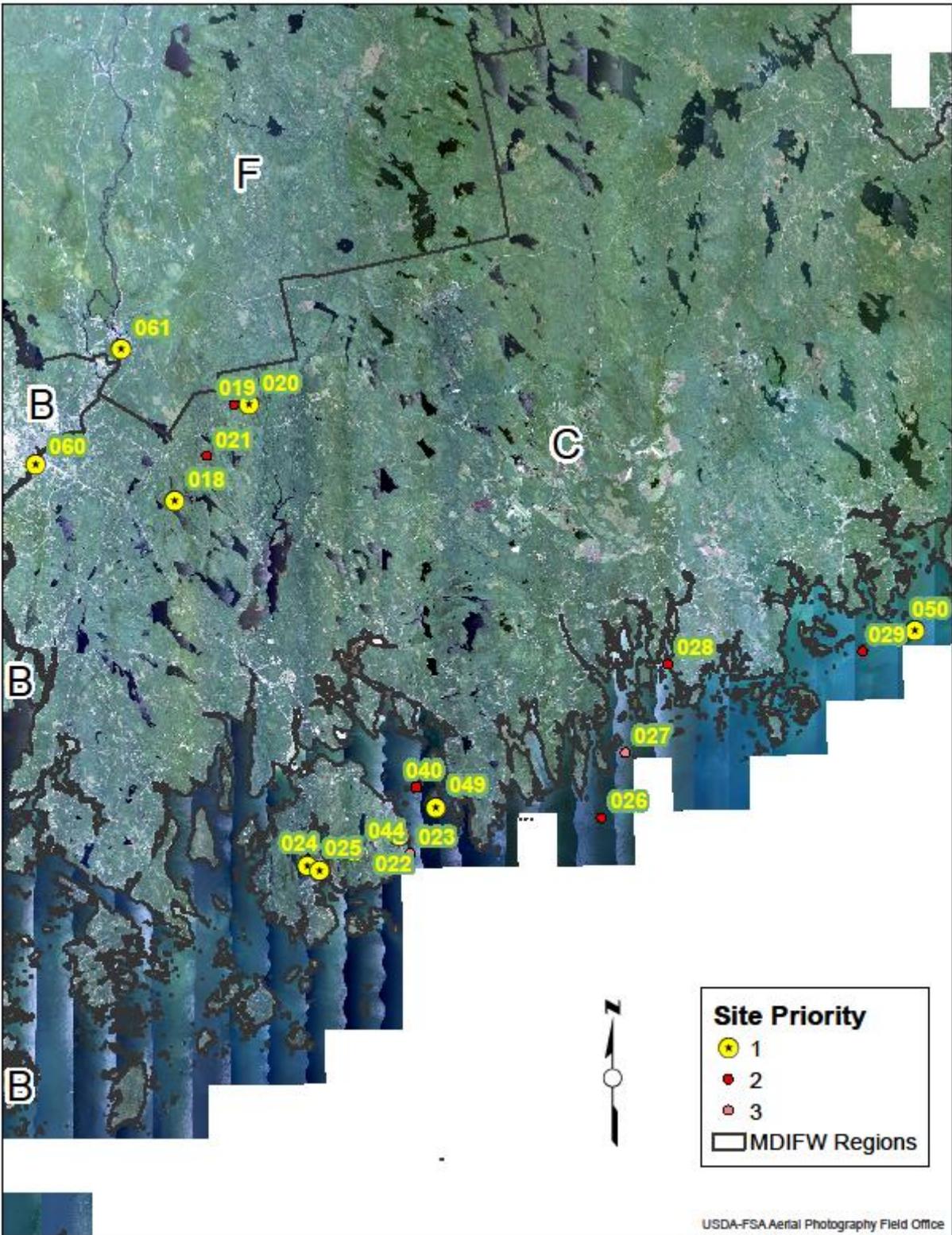
Photo by Murray Carpenter



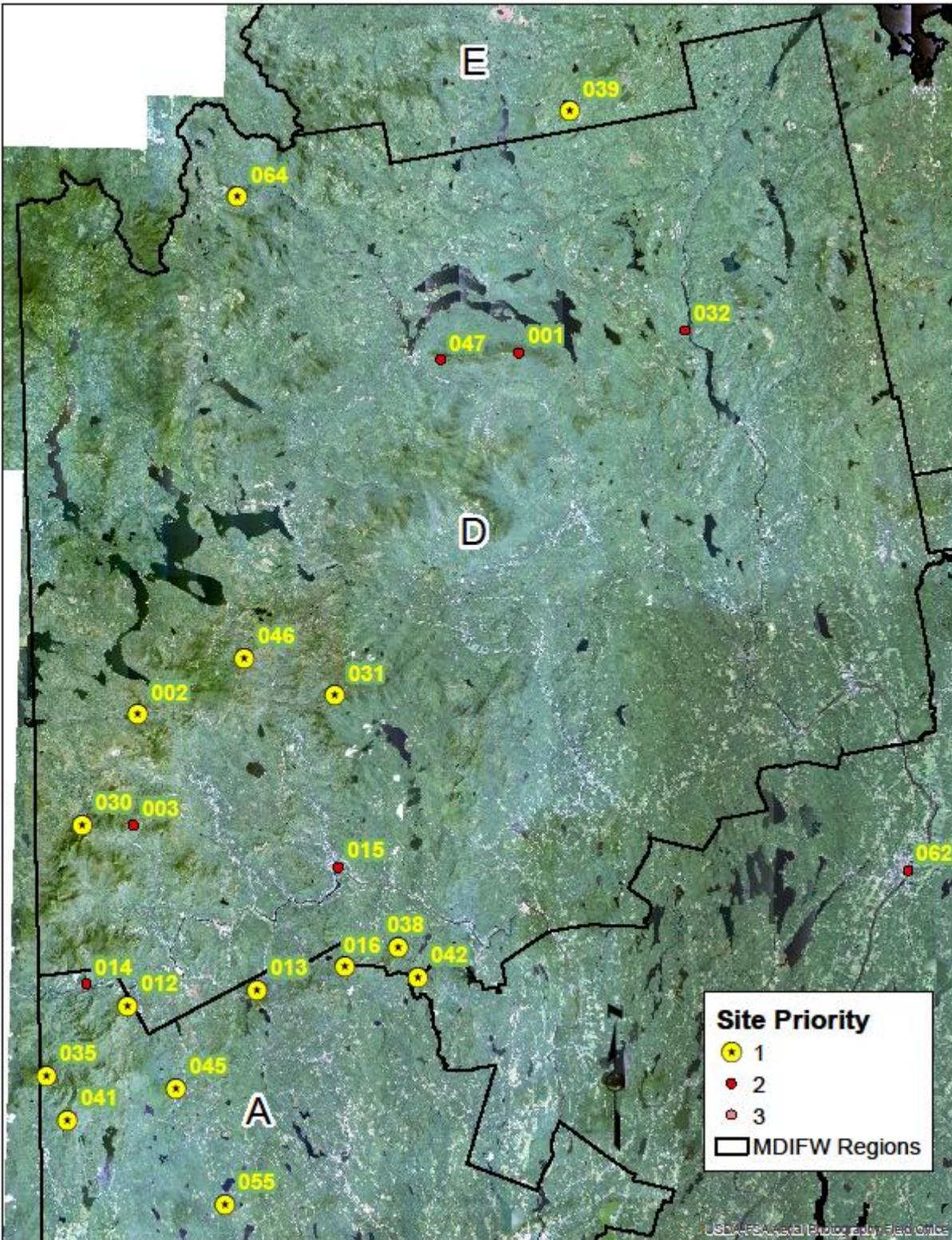
Appendix 1 cont. Maine peregrine falcon survey sites within each Maine Department of Inland Fisheries and Wildlife management region, 2020.



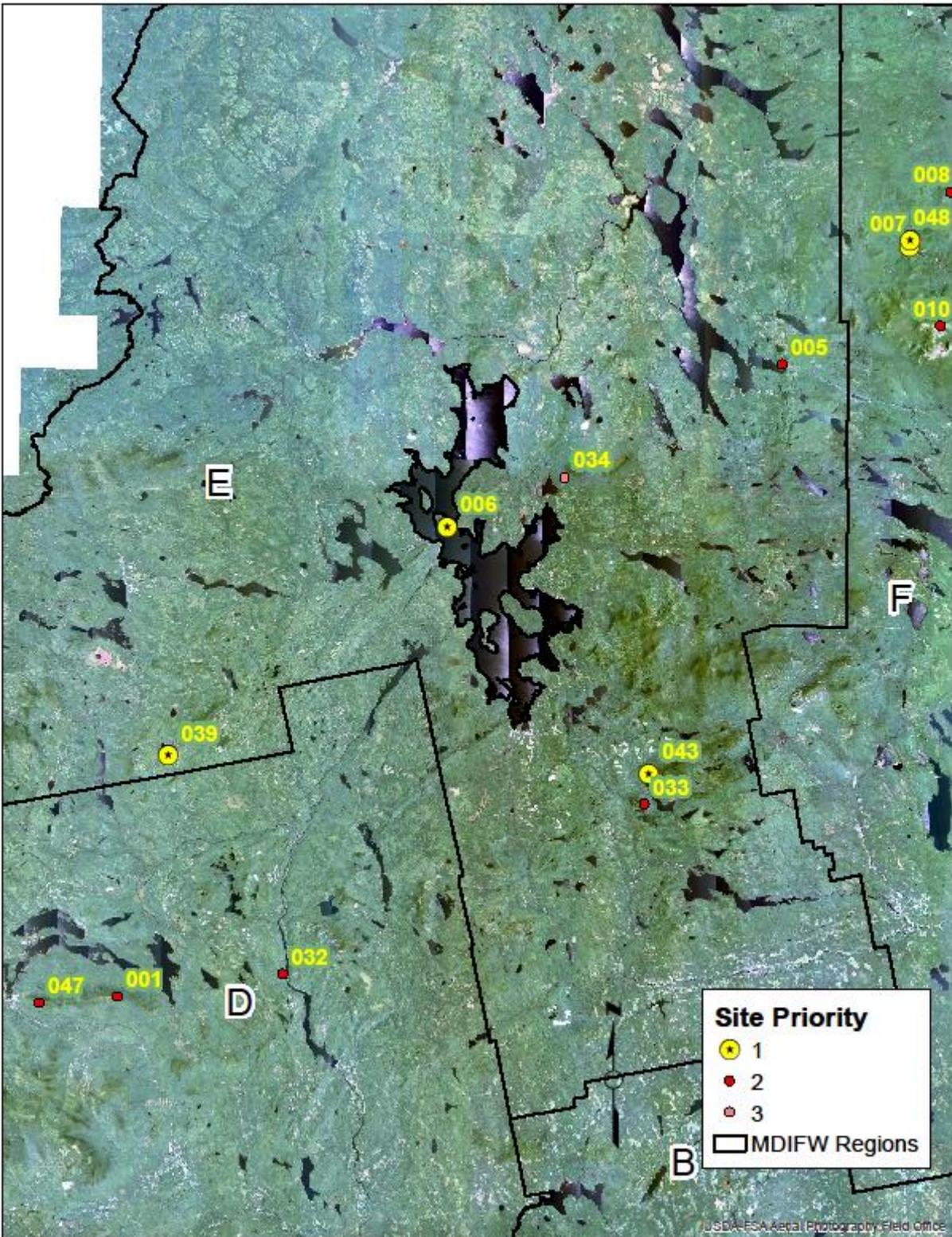
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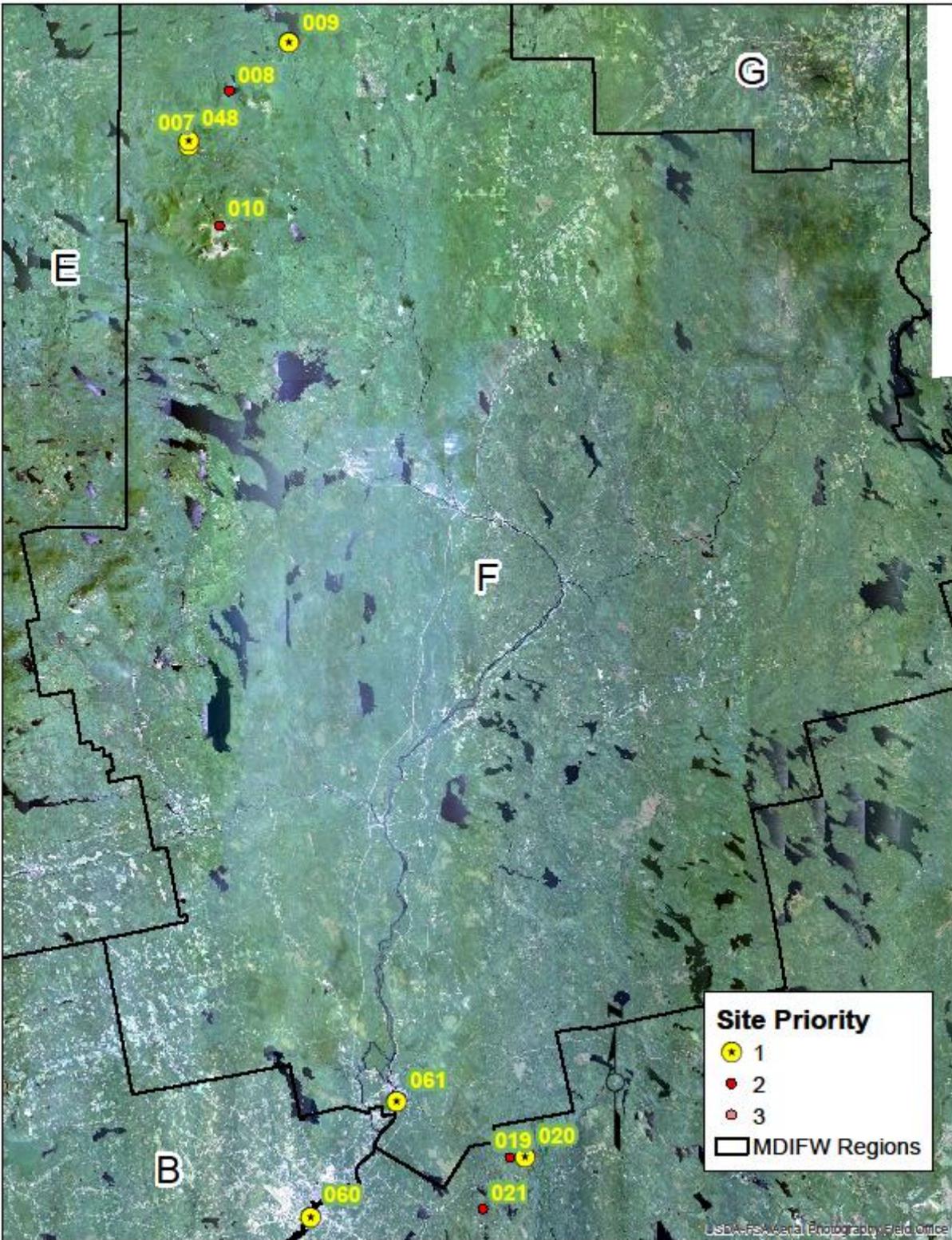
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Appendix 2. What to do if you find an injured peregrine falcon (contact MDIFW for pdf).

WHAT TO DO IF YOU FIND AN INJURED PEREGRINE FALCON



Urban peregrine falcons can get injured through collision with buildings, wires, or vehicles. During the summer in Maine, fledgling peregrines often find themselves on the ground when learning how to fly. If you find a peregrine falcon, please follow the guidelines below:

1. When recovering the bird, wear gloves and be careful of sharp talons and beak. Place it in a cardboard box with padding on the bottom, like an old towel. The box should be ventilated and set in a quiet, temperature controlled area. Do not provide food or water.
2. Contact the following:
 - Between 8:30 am – 5:30 pm, Mon - Sun, Avian Haven, 207.382.6761. Leave a message after hours and then call the appropriate number listed below.
 - Between 5:30 pm – 8:30 am, closest MDIFW Warden Service Dispatch Center:
 - Gray Dispatch: 1.800.228.0857
 - Augusta Dispatch: 1.800.452.4664
 - Bangor Dispatch: 1.800.432.7381

