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CLIMBING AND RAPTORS:

A Handbook for Adaptive Raptor Management

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This handbook is designed as a resource for individuals, local climbing organizations (LCOs), and land managers as they navigate the complex and crucial work of managing rock climbing activities in the proximity of raptors. Written in collaboration between leading raptor researchers and Access Fund, this handbook presents the best available science applied to the interaction between climbers and raptors. This document also addresses critical topics such as how to build relationships between climbers and land managers, develop monitoring programs, and effectively communicate with and educate the climbing community. This handbook replaces and supersedes previous Access Fund publications on raptor-climber interactions and management.

CHAPTER 1

INTRODUCTION

The terms raptors or birds of prey refer to a species of birds that are primarily carnivorous and includes falcons, eagles, owls, hawks, and vultures. Some species of raptors are listed as sensitive or endangered due to natural and human threats such as loss or degradation of habitat, climate change, and poisoning from pesticides and lead-based products.[1] Peregrine falcons are a raptor that commonly share cliffs with climbers. While closures for other types of sensitive raptors such as golden eagles may be in place at certain climbing areas,[2] the majority of seasonal closures related to climbing areas are in place to protect peregrine falcons.

Even though peregrine falcons were delisted as a federal endangered species in 1999, they still enjoy many of the same protections they did while listed. Besides protection under numerous state laws, all species of raptors are included in the Migratory Bird Treaty Act,[3] which federally protects raptors and all migratory birds from hunting or collecting for commercial purposes without a permit. Though peregrines have made a strong comeback, they are still listed as an endangered or sensitive species at the state level in several states.[4] Many peregrine management plans in place today have not been updated since their implementation in the 1990s, and land managers are still attempting to enforce the same federal protections from that era without considering the best available science from the past 20 years. This handbook draws from the scientific literature developed in more recent years, as well as fundamental research conducted pre-2000.

The peregrine falcon is one of the greatest success stories in the history of American wildlife conservation,[5] and climbers played a significant role in the recovery of this incredible bird. Utilizing a specialized skill set, climbers have not only provided data and monitoring services, but even placed peregrine chicks on nest ledges to help facilitate their recovery.[6] As one of the very few user groups who can access raptor nests, climbers are also, however, in a unique position to disturb nesting birds. This has led to seasonal raptor closures being a regular part of the climbing season for many locations across the country. Coexisting with and protecting raptors has become part of the climbing experience.

The thinking around raptor management has evolved in recent years. Blanket closures—where entire cliffs and/or climbing areas are shut down for a portion of the year—are becoming less common. Adaptive, monitoring-based management is becoming the standard. Blanket closures are not always based on bird behavior, climber-use patterns, or terrain. Increasingly, wildlife biologists and climbers are instituting management or seasonal closure areas that cover a limited section of cliff line, based on site-specific conditions and data. Adaptive management practices are bolstered by partnerships between climbers and land managers, and by establishing volunteer monitoring programs for which climbers are particularly well suited, thanks to their knowledge of local crags and ability to access cliff sites.

ADAPTIVE MANAGEMENT

According to the US Forest Service,

> adaptive management is a system of management practices based on clearly identified intended outcomes and monitoring to determine if management actions are meeting those outcomes; and, if not, to facilitate management changes that will best ensure those outcomes are met or re-evaluated…. Such proposals must also describe the monitoring that would take place to inform the responsible official during implementation whether the action is having its intended effect.[7]

In other words, adaptive management is a system centered on iteration. As new data and/or science about a given management scenario emerges, plans and tactics are adjusted accordingly. This strategy stems from the recognition that knowledge about natural resource systems is sometimes uncertain and can change.[8]

An important part of any first decision is to design management actions that will produce information and allow for possible adjustments during a second phase of management.[9] Adaptive management proposals should identify the adjustments that may be made when monitoring, and analysis indicates an action is not having the intended effect.[10] Specifically, in relation to raptors, practices should be regularly evaluated and, if necessary, revised to ensure that they are effective in lessening potential detrimental effects of recreation activities on bird populations.

SEASONAL CLOSURES

A seasonal closure is a temporary closure during raptor breeding season put in place to increase the likelihood of the reproductive success of the birds. Establishing and compliance with appropriate closures is important to ensure the health of the wildlife the closures are designed to protect. Seasonal closures may be necessary to allow the raptors space to breed, produce, and fledge their young. Given enough disturbance, raptors may abandon their nests, ruining any chance for fledglings that year.

Just as land managers must make nuanced adaptive management decisions to address the needs of raptors and optimize recreation opportunities, climbers must also do their best to protect wildlife. The natural environment, including raptors, are an intrinsic part of climbing. The climbing experience encompasses many aspects, from the physical act of moving on rock itself to the thrill of seeing a peregrine dive far above a forest canopy. Management actions that protect raptors, such as scientifically appropriate seasonal closures, also protect this experience.

THE ROLE OF CLIMBERS

Climbers are in a unique position in that they are one of the few recreational user groups that can directly impact raptor breeding success in both positive and negative ways. Climbers have several key responsibilities: respecting closures, volunteering skills as part of monitoring and data collection efforts, working with land managers to determine appropriate raptor management areas, and communicating with and educating the climbing community. When climbers collaborate to accomplish all of these objectives, they ensure not only the success of raptors but also that the minimum possible closures are being instituted.

CHAPTER 2

FACTORS TO CONSIDER IN RAPTOR MANAGEMENT

WHAT FACTORS IMPACT RAPTORS?

In order to establish a science-based climber-raptor management strategy, it is crucial to understand the factors that influence raptor behavior and nesting success. The following principles will apply equally whether you are starting from scratch or looking to transition an existing closure toward an adaptive management strategy.

The main determinants of predicting raptor behavior relevant to climbers are:

1. the characteristics of the cliff and landscape in which raptors are nesting;
2. the nature of preexisting human activity in the area;
3. the tolerance/sensitivity of the individual birds to visual disturbance; and
4. specific seasonal variations in sensitivity to environmental changes and disturbances.

By considering these four factors holistically, as well as on a site-specific basis, climbers and land managers can determine a tailored and effective management strategy for their local climbing areas. Though these factors are broadly applicable to raptors in general, the following discussion is tailored for peregrines.

Factor 1: Nest site/eyrie - Eyrie[11] assessments look at the potential of a site to attract and support nesting raptors. Not all nesting sites or breeders can be expected to have the same success at fledging young. Raptors will be more resilient to disturbance if they find a higher quality eyrie, and different species of raptor require different eyrie characteristics to succeed. It is also important to note that alternate nests may be used by a pair of raptors. A pair often maintains multiple nest sites within their territory, although only one will be used during a given year. Monitoring needs to focus on all of these sites, not just ones in climbing areas; if the raptors choose an alternate nest away from climbing, any closures can be lifted immediately.

Eyrie quality can be broken down into three levels: A, B, and C grades.[12] The higher the grade, the more resilient the raptor is to predators, human disturbance, and weather, and the better their position for finding food to feed their young. The following descriptions are specific to falcons, the peregrine in particular.

Grade A Cliffs are the highest quality, assuming adequate prey is nearby.[13] Grade A sites are high enough on cliff faces to afford consistent visibility and protection for the raptors that will not change over time. For falcons, these cliffs are usually an almost sheer rock face, or closely spaced pinnacles that are more than 200 feet (>60 m) in height from the top to the wooded slope beneath and are part of a rocky escarpment that is at least 500 feet (150 m) long; such cliffs provide lookout points and cover for the falcon, with more than one "good" nesting ledge.[14] A "good" nesting ledge will be one that is protected by an overhang of rock from the direct rays of the sun and direct rain and that contains material, either rock or soil, in which a slight indentation known as a "scrape" can be made by the falcon to contain her eggs (most other raptor species build nests instead).

It is important to consider that the optimum cliff height will vary by latitude and will not always include an expansive 200 feet.[15] In environments with less vegetation and harsher conditions (i.e., northerly, cold latitudes), somewhat smaller cliffs may still qualify as grade A, while in tropical and temperate climates grade A cliffs need to be high enough over the surrounding landscape that temporal (i.e., seasonal) changes in vegetation will not adversely affect hunting close to the eyrie.

Similarly, it is worth noting the importance of resource availability and how that interacts with eyrie class. In some areas, such as the more arid regions of the west, prey availability is likely the determining actor in eyrie occupancy. However, in the forested landscapes of the east, overall landscape productivity is higher and prey is more widely available. In these regions, raptors may inhabit more B and C grade eyries, since nesting substrate, not prey resources, limits their ability to reproduce.

Grade B cliffs are usually an almost sheer or jumbled rock face less than 200 feet high and less than 500 feet in width with at least one "good" nesting ledge and other possible "fair" nesting ledges. Grade B cliffs can be affected by temporal changes in vegetation that can adversely affect or enhance hunting close to the eyrie. Therefore, quality ratings for these cliffs can fluctuate between grades B and C as the surrounding vegetation changes.[16]

Grade C cliffs are short cliffs (relative to latitude) consisting of one or more rock outcroppings, one or more of which contain a possible raptor nesting ledge. It is usually part of a 300-foot (91 m) wide or lesser escarpment of a more continuous nature, different from the contiguous "good cover" type present in grade A or B cliffs.[17] Small size cliffs with a vegetative screen over the lower portion can make the site more difficult to defend and hunt from, making it a more marginal nesting habitat.[18] Grade C cliffs are often affected by existing vegetation that can adversely affect the eyrie.

QUESTIONS TO ASK:

- What is the climbing area's quality grade (A, B, or C) for raptor nesting?

Factor 2: Resilience to human activity - There are four major factors that determine how tolerant falcons will be of human activity near the eyrie:

1. Type of human behavior
2. Predictability of the activity
3. Frequency and magnitude of the activity
4. Timing of the activity

Where human activity is non-threatening and relatively predictable, raptors have shown a remarkably high degree of tolerance, often becoming accustomed to environments that would not seem like reasonable nesting sites. This is evidenced by the healthy peregrine populations making eyries on major bridges spanning busy highways in urban areas from Portland to New York City.[19] Alternatively, in remote environments where the raptors are unaccustomed to human activity, the birds tend to be more sensitive and likely to feel threatened.[20] By understanding how the four above factors vary at a local crag, the extent of nearby human activity that is allowable during a closure can be determined.

Human Behavior - The behavior of recreationists can have an influence on wildlife response.[21] Rapid movement directly toward wildlife frightens them, while movement away from or at an oblique angle to the animal is less disturbing.[22] Slow-moving disturbances in any spatial context appear to elicit a milder response from wildlife in general. For example, humans that slowly approach waterfowl flush fewer birds than humans moving rapidly.[23]

Responses also are influenced by the topography of the nesting cliff and surrounding vegetative screening (referred to as the "viewshed"[24]), which limit the area within view of the eyrie. Nesting raptors will be more sensitive to people within the viewshed above their eyrie than to people below or across from it. Desertions are usually the result of prolonged disturbances at sensitive times of the year that keep the bird off the eyrie for several hours; these sometimes happen when rock climbers spend a long time on a route close to the nest ledge.[25] Even so, there are signs that on larger, more open cliffs (grade A and B cliffs), peregrines may adapt to even this degree of intrusion. For example, broods have been successfully reared on several unregulated much-climbed cliffs[26] and in active rock quarries.[27] The primary takeaway is that individual nesting pairs will react differently to activity and disturbance levels. Adequate monitoring can establish the degree of tolerance.

Predictability - In general, predictability of a given activity will shape a raptor's response to it. When animals perceive a disturbance as frequent enough to be expected and nonthreatening, they show little overt response.[28] On the other hand, if wildlife perceive a disturbance as unpredictable and/or threatening, they react quite differently, and will likely exhibit defensive behaviors. Peregrine nesting in active quarries were tolerant of disturbance, although their reactions depended on whether disturbance occurred inside or outside quarry working hours.[29]

Frequency and Magnitude - The degree to which a disturbance has an impact will depend on its frequency and magnitude. A number of studies have compared reproductive success of birds at frequently visited nest sites with those that were infrequently visited. In general, nest sites visited more often exhibited lower reproductive success.[30]

Timing - The impacts of disturbances are not consistent throughout the year and the breeding season. The period of greatest sensitivity to disturbance occurs during nest selection and incubation.[31] The effect of prolonged disturbances occurring on cliffs near eyries is inconclusive.[32] In many cases when the peregrines chose to reoccupy a cliff where climbing was actively occurring, many did not seem disturbed by climbing that did not directly approach the nest.[33] However, there may be a greater concern in locations where peregrines establish territories early in the spring, before hiking, rock climbing, and other recreational activities begin.

QUESTIONS TO ASK:

- Which activities are ongoing or new, and how frequently or predictably do they occur?
- Which activities occur within sight of the scrape or nest ledge?
- Which activities are likely to occur during courtship (February to early March)?
- What access routes and corridors (such as roads and trails) are used, and how frequent or predictable is that use?

Factor 3: Viewsheds and buffer zones - The buffer zone is the protected area that extends out from the actual raptor nesting site, within which it may be beneficial to limit recreational access. Buffer zones can be of different sizes and degrees of restrictiveness, depending on topography, the nature of activity within the zone, the tolerance of the raptors, and the species of bird, among other factors. Original guidelines from the 1980's for managing disturbances around eyries include the consideration of disturbances from both visual and audio sources.

Audio Disturbance - Raptors may tolerate considerable noise close to their nests if they are familiar with it (for example, nesting on highway bridges in busy urban areas), unless they have learned to connect that noise with a visual threat.[34] Their response to audio disturbances from climbing and other forms of recreation can be expected to be minimal and would not appear to limit raptor productivity.[35]

Visual Disturbance - Studies have found a greater need for disturbance buffering within view of an eyrie ledge during nesting rather than from audio disturbances.[36] As such, visual disturbance is the main factor that needs to be accounted for when creating a buffer zone of restricted access around an eyrie. The role of visual buffers is an important concept, as it can result in reduced spatial restrictions by separating critical wildlife areas from threatening disturbances. Trails and other non-threatening activities can be compatible in close proximity to an eyrie or perch if that activity is visually buffered by vegetation or topographic features.[37] In other words, the "viewshed" from the eyrie—what the birds can and cannot see—is critical in determining an appropriate buffer zone.

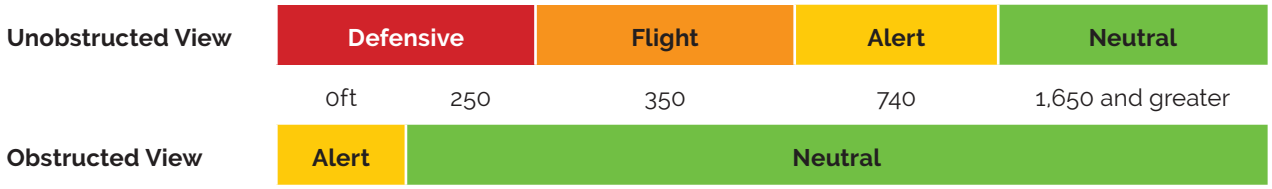
Knowledge of the viewshed provides a more accurate landscape assessment of a raptor's needs. A geographic information system (GIS)-assisted viewshed approach, followed by validation monitoring, has been shown to be an effective tool for reducing potential threatening disturbances during sensitive periods.[38] The use of viewsheds provides a manager with a realistic understanding of spatial requirements. The viewshed approach to spatially managing disturbance can be highly effective yet require less protected area than a traditionally prescribed circular management zone strategy.[39]

Photo courtesy of: © Chris Winters

Figure 1 - An example of a nesting raptor's viewshed. Red-shaded terrain is what the raptor can actually see. Activity in this area is more at risk of creating disturbance, though in this image, ground disturbance would likely be mitigated by the extensive tree cover.

Viewshed Buffers - A common method used to prescribe viewshed buffers or prioritizing areas for confirming existing closure involves sorting measures of disturbance distance into different "territorial response classes," meaning the response of the raptors to the disturbance. Response classes include the following:

- Neutral - no response from the falcons.
- Alert distance - the distance between the disturbance and birds to the point where the birds change their behavior in response to the approaching disturbance source.
- Flight and Defensive - the distance at which the birds will flush or otherwise move away from the approaching disturbance source and actively protect their nest (i.e., potentially dive-bombing intruders, shrieking, etc.).



Total Distance = (elevation above or below nest ledge) + (horizontal distance)
For monitoring purposes it may be helpful to include flight as a defensive response.

Response	Season	Distance (ft.) from Nest Ledge min.	avg.	max.	Note	Reference
Defensive	Nest Selection to Fledge	350			*Minimum radius around eyries.*	Ratcliffe (1993:271-272)
Flight	Nest Selection to Fledge			820	*90% of the time flushing did not occur when researchers were 820 feet from the nests.*	White and Thurow (1985:21)
	Nest Selection to Fledge	200		300	*Where vegetation efficiently reduces line-of-sight contact.*	Stalmaster and Newman (1978:512)
Alert	Incubation	35	740	2,640	*Mean = 80% of surveyed professionals*	Ruddock and Whitfield (2007)
	Chick Rearing	490	1,020	2,640	*Mean = 80% of surveyed professionals*	Ruddock and Whitfield (2007)
	Nest Selection until Eggs Laid	650			*Minimum viewable distance either side of nest ledge while climbing.*	Brambilla et al. (2004:429)

Figure 2 - Territorial response class prediction table. The above graphic represents the rule of thumb data on determining buffer distance when buffers have not already been established. In general, buffers should be set up to keep the falcons in the "neutral" zone to the extent possible. It is important to note that distances will initially be based on expert opinion recommendation. Distances should be regarded as a preliminary starting point until further validation has been undertaken. Furthermore, distance (while crucial) should not be used as a single factor for predicting territorial responses.[40] Where there is some form of visual screening, such as tree cover, buffers should be a minimum of 350 feet (107 m) long within the viewshed (including the height of the eyrie above the tree canopy, or ground if there is no vegetation).[41] Where there is no visual screening, a starting buffer should be a minimum of 740 feet (226 m) long within the viewshed,[42] until monitoring confirms an appropriate size. Areas more than approximately 1,650 feet (503 m) away from the eyrie will usually not require buffering. Buffers outside the viewshed (i.e., behind the eyrie) will rarely need a buffer of more than 250 feet (76 m). Buffer distances must, of course, be adapted to the specific factors and topography of the local crag, and may need to be larger than the minimum numbers given here. See appendix C for a more detailed table.

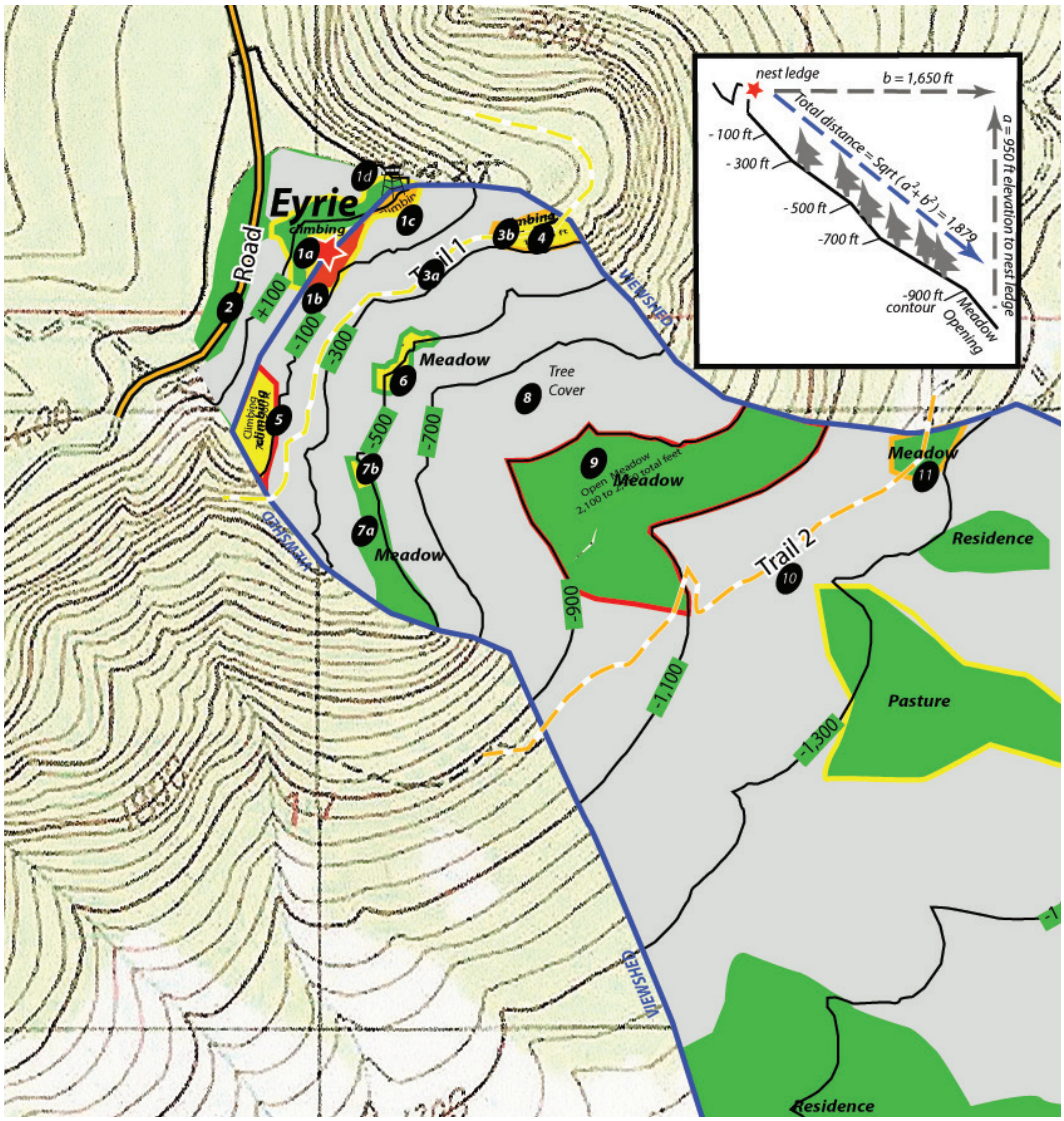


Figure 3 - Mapping example of predicting response classes across a viewshed. Note how open areas, like meadows, fall into the "alert" (yellow) class if they occur close to the eyrie, and the "neutral" (green) class if they occur further away or are visually screened. Most of the forested (i.e., visually obstructed) slope below the nest is neutral territory. The area immediately below the eyrie falls into the "defensive" (red) class, while open areas nearby (i.e., the cliff face where the falcons are not nesting) falls into the "flight class" (orange).

#	Area	Response Class
1a	Eyrie back - climbing	Neutral
1b	Eyrie front - climbing	Defensive
1c	Eyrie side - climbing	Alert
1d	Lookout tower	Alert
2	Road	Alert
3a	Trail 1, under tree canopy	Neutral
3b	Trail 1, through an opening	Neutral
4	Climbing area	Alert
5	Climbing area	Alert
6	Open meadow	Neutral
7a	Open meadow	Neutral
7b	Open meadow	None
8	Tree-covered slope	None
9	Open meadow	None
10	Trail 2	None
11	Open meadow	None

QUESTIONS TO ASK:

- Which activities occur within sight of the scrape or nest ledge?
- To what extent does vegetation shield these activities from view?
- How far away from the nest ledge do these activities take place, accounting for height of the nest ledge above the ground?
- Considering visual screening from vegetation, what response class are the raptors likely to fall into for a given activity?

Factor 4: Seasonal sensitivity - The final factor to consider in determining an appropriate closure is seasonal variation in raptor sensitivity. Certain times of the year—especially early in the nesting cycle—are ones of higher vulnerability for raptors (figure 4). The following descriptions should be considered in the context of the three previously mentioned factors. For instance, for any given distance, disturbances occurring outside the viewshed or within the viewshed with visual side-screening will not necessarily result in a similar territorial response as when the same disturbance occurs in open view within the viewshed.

Mid-February to early March - Courtship: February through early March is the period when migratory raptors arrive at the cliff and courtship takes place. During this period, one can expect a moderate to high risk that disturbance could cause abandonment or movement to another site. Falcons can be particularly sensitive to disturbances and scrape site abandonment from the time they are courting and selecting a nesting ledge (e.g., mid to late February through early March) until a scrape or nest ledge is selected and the male begins bringing in prey. Prior to nest selection, responses are fairly unpredictable to disturbances out in the open. Once a ledge is selected, territorial behavior centers around the viewshed and becomes predictable. That said, it usually takes repeated disturbance at close range and/or major disturbances for extended periods to reach a threshold that would cause site abandonment.

Mid-March to early April - Incubation: This is a period when certain individuals can be wary about going back to the eyrie if a human is visibly closer than 1,600 feet or 0.31 mi (0.5 km), while others will return while an intruder is still on the cliff quite close at hand, especially if the weather is cold or wet.[43] Note that the incubation phase can start in April, or later, in subalpine habitats. As a general rule, the period from mid-February through early April is typically considered to be a sensitive period for eyries below subalpine.

Mid-April to early June - Hatching: During this time period, nest abandonment is less likely though still possible, and recreational activities are also less likely to result in significant disturbance to the raptors.[44]

Late May to Mid-June - Rearing to fledging: Young will leave the nest roughly 40 days after hatching, but are often able to sustain flight as early as 35 days in age.[45] Any remaining closures should be lifted no later than two weeks after the young have fledged from the nest.[46] Eyries fledging young late in the season (e.g., July and beyond) may suggest that there have been second or perhaps even third clutches. This can be an indicator that they are losing eggs or nestlings.[47] Losing eggs or nestlings is often a result of nesting in a marginal site. Over time, a marginal site is not likely to produce many offspring.

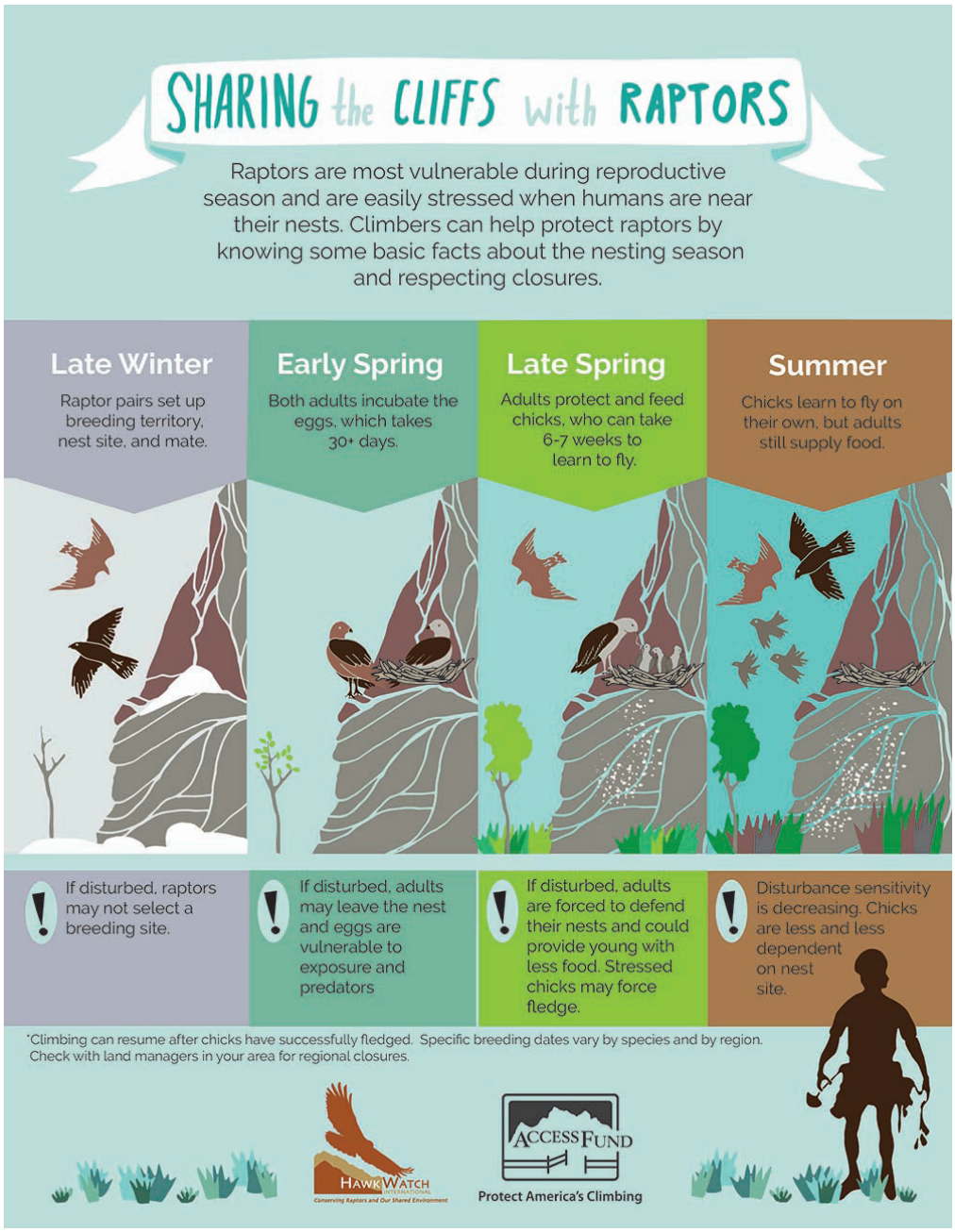


Figure 4. Access Fund and Hawk Watch collaborative educational material for seasonal sensitivities of nesting raptors.

Determining the appropriate management strategy - The four major factors impacting raptor nesting success need to be considered holistically when deciding what the best course of action is for a given area. Approach trails and crags distant or visually screened from raptor nesting sites may not need a closure at all, while areas within the most sensitive zones may require season-long closures. Some zones may fall in between these extremes, requiring a shorter or smaller closure or some other form of mitigation. Each crag will require its own management prescription based on the unique combination of the four main factors at the specific site, a prescription which can—and often should—evolve both within a season and from year to year as more data is gathered and the behavior of the site's raptors is better understood.

If a closure is necessary, the length will vary for each site based on individual raptor nesting activity. Ideally, onsite monitoring would be conducted from the late winter/early spring nest selection period to when the young have fledged or the nest has failed. Often a lack of land management resources and staff result in no on-site monitoring being conducted and blanket seasonal closures being implemented, but this is highly undesirable. Where agency resources are lacking, community science and volunteer monitoring programs become essential to ensure appropriate recreational access; the next chapter discusses this in more detail. Blanket seasonal closures may start sometime between February and April and last until two weeks after young have fledged, typically in June below subalpine conditions. Strong data, however, can help land managers better pinpoint when the optimal start and end dates of a closure should be.

QUESTIONS TO ASK:

- Are there monitoring records available for the area?
- How successful have these eyries been in fledging young?
- Are there monitoring records of other ledges or rock faces in the area being used for nesting that are not currently being used?
- What date does courtship typically begin?

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CHAPTER 3

COLLABORATION, MONITORING, AND COMMUNITY SCIENCE

COLLABORATION BETWEEN CLIMBERS AND LAND MANAGERS

Productive, respectful relationships between local land managers and climbers are essential to long term climbing access, sustainable climbing infrastructure, and the health of raptors. Climbers can enhance land managers' capabilities when it comes to many aspects of resource management, including monitoring and data collection for nesting raptors. Local climbing organizations (LCOs) and individual climbing advocates are more successful at protecting both climbing access and birds when they foster collaborative relationships with agencies and wildlife biologists. LCOs can assist land managers in a variety of ways, including by providing:

- Climbing resource information (climbing area locations, access points, parking, and general climbing use patterns specific to your crag);
- Climbing management resources related to natural resource management
  - www.climbingmanagement.org;
- Communication resources (i.e., sharing closures and educational messaging via social media, emails, and mountainproject.com);
- Assistance in developing a volunteer monitoring program.

Similarly, land managers can collaborate with climbers by:

- Being transparent and clear about the decision-making processes that impact climbing access;
- Reaching out to climbers proactively for feedback and consultation on those decisions;
- Providing timely updates on raptor status;
- Practicing adaptive management/staying open to adjusting management practices based on the best available data, whether that means increasing or decreasing restrictions; flexibility in management prescriptions to accommodate changes in both the ecosystem and visitor use will improve relations between managers and recreationists.

QUESTIONS TO ASK:

- Have land managers (lead biologist, district ranger, etc.) and climbers connected?
- Is there a history of a seasonal closure at this climbing area? If so:
  - If coming from the federal or state government, is it a voluntary or mandatory closure?
  - Is there a monitoring plan, and is it implemented each season?
  - Is the closure lifted each season no later than two weeks after the young have fledged?
  - Do stakeholders have expertise in the recreational activity being monitored (e.g., climbers)?
- Have land managers and/or local climbers connected with the Access Fund?

Monitoring and citizen science - The primary need for any monitoring plan is to state explicitly what your group would like to learn from monitoring.[48] Interagency Monitoring Working Group recommendations for monitoring include implementing the best available science and management practices, ensuring that implementation meets the goals of protecting raptors while minimizing restrictions on recreation, and testing assumptions through rigorous data gathering (validation monitoring).[49] Typically, peregrine monitoring has focused on the enforcement of closures and the number of young fledged. However, increasing populations or stable ones with high density probably do not warrant management to increase reproductive success or to redistribute young.[50]

The primary purpose of validation monitoring is to:

- Inform partners and the responsible official during implementation whether the action is having its intended effects,
- Clearly identify the adjustment(s) that may be made when monitoring indicates that the action is not having its intended effect, or is causing undesirable effects, and
- Strengthen the understanding of probable cause-and-effect relationships that impact raptors.

One of the most successful examples of climbers and land managers working together to protect raptors and recreational access is the implementation of volunteer monitoring or citizen science programs where volunteers, climbers, and/or LCOs partner with land managers and biologists to assist in collecting on-site data related to raptor activity. The backbone of any adaptive management strategy is monitoring, and these sorts of programs are critical elements to successful science-based recreation management strategies. Thanks to the frequency of climber visits, and the ability to access high angle terrain, climbers can play a particularly important role in data collection and nest monitoring.[51]

If there is not an established volunteer monitoring program at a climbing area that is shared with raptors, climbers and land managers should collaborate to start one. These programs are good for climbers, managers, and birds: Gathering robust data is essential not only to keep tabs on how the nests are doing and craft strong management strategies, but also goes a long way toward ensuring that if seasonal closures are necessary, they are optimized in geographic and temporal extent. Fortunately, raptor monitoring protocol is well established (see Appendix B for a detailed monitoring protocol).

A successful monitoring program should include:

- Adequate funding
- Clearly stated objectives (what are the goals?)
- Land manager ability to develop monitoring systems and oversee volunteer efforts
- An active and sufficient volunteer base
- Volunteer training and mentoring public interest
- Easy to use and access data collection technology and appropriate monitoring equipment (i.e., binoculars, spotting scopes, etc.)
- Consistent monitoring throughout the nesting season
- Effective data analysis and reporting, including making results easily available
- Clearly defined adaptive management strategies that include regular meetings between volunteers and decision-makers to incorporate monitoring data into management policy

QUESTIONS TO ASK:

- Is monitoring currently being conducted by the land manager? If so, is there a need for additional monitoring?
- Is the land manager open to starting a volunteer monitoring program?
- Does the LCO have the capacity/interest to run or participate in a monitoring program?

CHAPTER 4

COMMUNICATION AND EDUCATION

Land managers, LCOs, and individual climbers play a crucial role in getting the word out about closures. There are several effective ways to ensure that climbers understand the importance of seasonal closures and do not unintentionally trespass in a closed area. These include:

- Updating Mountain Project pages. Get in touch with the administrator for the local Mountain Project pages and make sure that any closure information is added to relevant crags. Access Fund also can make these updates if informed of closures. Mountain Project makes it very easy to highlight access issues like restrictions. Two weeks after fledging should be the default end date for closures.
- Ask your LCO to help spread the word. In most areas, LCOs are a primary outlet for sharing seasonal raptor updates and closure areas. LCOs are ready to work with land managers to share this information with their audience via website, social channels, and email lists.
- Sharing seasonal closure information with publishers of climbing guidebooks. Where closures are a regular, predictable occurrence, guidebooks can share approximate start and end dates and areas impacted, allowing climbers to better plan around limited access.
- Posting notices in local gear shops and community centers (restaurants, campgrounds, etc.). Even in today's online age, flyers in strategic locations can still go a long way toward raising community awareness.
- Posting notices at the crag. Highly visible signage, placed at trailheads, parking areas, visitor centers, and at the start/end of the closures themselves, are required not only for communication but also to clearly delineate the actual boundaries of the closure.
- Sending out information via email lists. Take advantage of a captive audience: Most people who sign up for LCO mailing lists want to hear from the organization.
- Utilizing social media. Facebook, Instagram, Twitter, and other social media venues have become essential tools for education and communication.

Compliance with closures is more likely when climbers understand *why* they matter. Communicate logistics (start and end dates, routes impacted, etc.), and highlight the importance of the closure for local wildlife. Give details about how LCOs, climbers, and land managers are working together to implement a flexible, science-based management strategy and provide opportunities for stakeholders to get involved through monitoring.

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Questions?
Please reach out with questions and feedback to **policy@accessfund.org**.

APPENDICES

These appendices provide additional, more detailed resources on raptor management, including an extensive list of scientific references, volunteer raptor monitoring protocols, terms and concepts, and relevant law. Short descriptions of each appendix are below, and can be accessed at the following link:

Climbing and Raptors - A Handbook for Adaptive Management (Appendices)

Appendix A: Full Bibliography
In addition to the endnote citations within the text, appendix A contains a bibliography of raptor management literature that includes many resources not cited here. Please contact us with suggestions for additions to this list.

Appendix B: Volunteer Raptor Monitoring Program Overview
This appendix offers basic information and best practices on raptor monitoring for citizen scientists/ volunteers.

Appendix C: Raptor Species Descriptions
This appendix provides detailed descriptions for various raptor species and nesting behavior, and also includes a sample monitoring form.

Appendix D: Terms and Concepts
This appendix defines key terms and concepts related to raptor biology and management.

Appendix E: Relevant Law
This appendix contains citations for laws, court cases, executive orders, and official opinions related to raptors.

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