



## 7.2 Flight initiation distance buffers

Flight initiation distance (FID) is the distance at which an animal will start to move away from an approaching threat such as a trail user. FID has been recorded for a variety of species and these distances may serve as general guidelines for establishing buffers from critical wildlife areas (see table).

These distances are based on being approached by a single person on foot. Groups of people may require wider buffers. Many other factors influence FID and a wildlife biologist should be consulted.

Flight Initiation Distance		Flight Initiation Distance	
Species	Flight Distance (feet)	Species	Flight Distance (feet)
Mule Deer	490 to 820	Golden Plovers	660
Pronghorn	770	Great Blue Heron	660
Elk	280 to 660	Merlin	60 to 600
Bison	330	Prairie Falcon	60 to 600
Golden Eagle	345 to 1280	Great Egret	330
Rough-legged Hawk	175 to 2900	Meadowlark	100
Bald Eagle	165 to 2900	Robin	30

Note that FID is the distance at which the animal begins to evade a threat; an additional setback should be added to the FID to create a buffer that will minimize wildlife disturbance. An additional 130 to 170 feet has been recommended as the additional buffer distance.

## 7.2 References

- Altmann, M. 1958. The flight distance in free-ranging big game. *Journal of Wildlife Management*. 22:207-209.
- Beale, C.M.; Monaghan, P. 2004. Human disturbance: people as predation-free predators? *Journal of Applied Ecology*. 41:335-343.
- Blumstein, D.T.; Fernandez-Juricic, E.; Zollner, P.A.; Garity, S.C. 2005. Inter-specific variation in avian responses to human disturbance. *Journal of Applied Ecology*. 42: 943-953.
- Blumstein, D.T.; Anthony, L.L.; Horcourt, R.; Ross, G. 2003. Testing a key assumption of wildlife buffer zones: is flight initiation distance a species-specific trait. *Biological Conservation*. 110: 97-100.
- Colorado State Parks. 1998. Planning trails with wildlife in mind. Denver: Trails and wildlife task force, Colorado state parks, and Hellmund Associates. 51 p.
- Cooke, A.S. 1980. Observations on how close certain passerine species will tolerate an approaching human in rural and suburban areas. *Biological Conservation*. 18: 85-88.
- Erwin, R.M. 1989. Responses to human intruders by birds nesting in colonies: experimental results and management guidelines. *Colonial Waterbirds*. 12: 104-108.
- Fernandez-Juricic, E.; Vaca, R.; Schroeder, N. 2004. Spatial and temporal responses of forest birds to human approaches in a protected area and implications for two management strategies. *Biological Conservation*. 117: 407-416.
- Fernandez-Juricic, E.; Venier, M.P.; Renison, D.; Blumstein, D.T. 2005. Sensitivity of wildlife to spatial patterns of recreationist behavior: a critical assessment of minimum approaching distances and buffer areas for grassland birds. *Biological Conservation*. 125: 225-235.
- Holmes, T.L.; Knight, R.L.; Stegall, L.; Craig, G.R. 1993. Response of wintering grassland raptors to human disturbance. *Wildlife Society Bulletin*. 21: 461-468.
- Miller, S.; Knight, R.; Miller, C. 1998. Influence of recreational trails on breeding bird communities. *Ecological Applications*. 8: 162-169.
- Miller, S.; Knight, R.; Miller, C. 2001. Wildlife responses to pedestrians and dogs. *Wildlife Society Bulletin*. 29: 124-132.
- Richardson, C.T.; Miller, C.K. 1997. Recommendations for protecting raptors from human disturbance: a review. *Wildlife Society Bulletin*. 25: 634-638.

Rodgers, J.A., Jr.; Smith, H.T. 1995. Set-back distances to protect nesting bird colonies from human disturbance in Florida. *Conservation Biology*. 9: 89-99.

Rodgers, J.A., Jr.; Smith, H.T. 1997. Buffer zone distances to protect foraging and loafing waterbirds from human disturbance in Florida. *Wildlife Society Bulletin*. 25: 139-145.

Schultz, R.D.; Bailey, J.A. 1978. Responses of national park elk to human activity. *Journal of Wildlife Management*. 42: 91-100.

Taylor, A.R.; Knight, R.L. 2003. Wildlife responses to recreation and associated visitor perceptions. *Ecological Applications*. 13: 951-963.