RANA CASCADAE (Cascades Frog). **NECROGAMY.** Necrogamy has been previously documented in *Rana boylii* (Bettaso et al. 2008. Herpetol. Rev. 39:462). Herein we report a similar mating observation in *R. cascadae* while conducting egg mass surveys at Deep Creek Basin, Trinity Alps Wilderness, Trinity County, California, USA. On 18 May 2009 at 1326 h, an adult male *R. cascadae* (60.6 mm SVL) was observed in amplexus with a deceased gravid female *R. cascadae* (77.3 mm SVL) ca 20 cm underwater in a shallow stream alcove (Fig. 1). The deceased female *R. cascadae* was partially decomposed and a film of fungal hyphae covered both sides of the body. The male *R. cascadae* appeared to be in good condition upon inspection after removal from the deceased female. This behavior could allow negative population effects for *R. cascadae* by reducing overall male courtship availability during their brief and explosive breeding seasons. Additionally, this behavior could have negative implications with direct transmission of diseases.

Fig. 1. Male *Rana cascadae* in amplexus with deceased conspecific in Deep Creek basin, Trinity Alps Wilderness, California.

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RANA CATESBEIANA (American Bullfrog). **PREDATION.** The Osprey, *Pandion haliaetus*, is a large (to 1.8 m wingspan) raptor whose breeding range includes western North America (Udvardy 1997. National Audubon Society Field Guide to North American Birds. Chanticleer Press, New York. 822 pp.). The osprey's diet consists almost exclusively of fish, although other vertebrates, including amphibians, are occasionally taken as prey (Birds of North America, Cornell Lab of Ornithology: http://bna.birds.cornell.edu/BNA/). However, taxon-specific accounts of amphibians as items of osprey diet are lacking. I here provide an account of osprey predation on *Rana catesbeiana*.

At 1300 h on 15 May 2007, I was watching male *R. catesbeiana* call and defend territories along the banks of a small (0.4 ha) farm pond in western Oregon, USA (WGS84, 50.08761°N, 51.6528°E). Frogs were calling while floating at the water's surface; their bright yellow throats were highly visible. Periodically, one would rush an intruding male from several meters away, grabbing at it and driving it out of its territory. At 1310 h, an adult osprey circled the pond; it passed over the frogs at between 10 and 15 m height. At this, the frogs immediately became silent and disappeared under cover. No amount of calling by me (normally a successful technique at this pond) could coax them to emerge or continue. The osprey, meanwhile, had landed ca. 15 m up in a fir tree overlooking the pond; it remained there, almost motionless. At 1317 h, after seven minutes of silence, the osprey leapt from its perch, flapped up into the air, and made a swift glide toward the far end of the pond. Stooping low over the water, it snatched a (ca. 150 mm SVL) *R. catesbeiana* from the surface with its talons, circled the pond once (with the frog), then flew away.

Besides the identity of the prey, an interesting aspect of this observation is the fact that the osprey made a long swoop at the prey. Typically, when capturing fish (Rainbow Trout, *Oncorhynchus mykiss*; Black Crappie, *Pomoxis nigromaculatus*; and Bluegill, *Lepomis macrochirus*) in this and adjacent ponds, ospreys hover over the target and make a swift, often vertical dive. Additional observations of osprey capturing frogs may reveal whether different capture methods are used for fish versus amphibian prey.

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RANA DRAYTONII (California Red-legged Frog). **DISPERSAL.** Very little information is available regarding dispersal of post-metamorphic juvenile *R. draytonii* from perennial ponds, although mass emigration in response to receding water has been documented for other pond-breeding anurans (Paton et al. 2000. Northwest. Nat. 7[3]:255–269, Pilliod et al. 2002. Can. J. Zool. 80[11]:1849–1862). During the 2003–04 and 2004–05 rain seasons, we captured *R. draytonii* incidentally in pitfall traps while conducting studies for *Ambystoma californiense* at five perennial ponds on the ca. 8094 ha Santa Lucia Preserve near Carmel, Monterey County, California, USA. The study area consisted primarily of a mosaic of grassland, coastal scrub, oak woodland, and redwood forest habitats in four watersheds (Potrero, Robinson Canyon, Las Garzas, San Clemente) that drain into the Carmel River and Pacific Ocean. The property was historically used to graze cattle, and the manmade stock ponds, which ranged in size from 0.08–0.53 ha, were situated in relatively open areas in or near grassland or oak savanna. The purpose of this note is to document mass dispersal of *R. draytonii* metamorphs from perennial ponds, which has conservation and land management implications given that the species is listed as Threatened by the federal government.

We initiated drift fence studies on 15 Oct in 2003 and 2004, prior to the first significant rain each season, and completed them by 1 April. Every pond was partially enclosed with 20 m lengths of 0.914 m high silt fence (Enge 1997. Herpetol. Rev. 28:30–31) buried at least 15 cm and situated 2–10 m from the high water line. Two to 10 m gaps were left between lengths of drift fence to allow free movement of amphibians on nights when the pitfall traps were shut. Each of the five study ponds were ≥ 65% enclosed by drift fence spaced equidistant around the entire perimeter. Paired pitfall traps (7.6 L) were installed 10 m apart at the ends and middle of each length of fence and covered with an elevated plywood shade. On evenings when rain was forecast (>50% likelihood), traps were opened and checked on the following morning; after each rain event traps were left open for one additional night. We recorded length measurements snout–urostyle length (SUL) from a subset of captured *R. draytonii* and released them in the nearest dense, moist vegetation on the opposite side of the drift fence (outward-bound) or at the edge of the pond (inward-bound).

Pitfall traps were open 57 nights in 2003-04 and 49 nights in the 2004–05 winter seasons. We recorded 308 captures of *R. draytonii* in both years combined, of which 220 were metamorphs (73%). Metamorphs were captured at all ponds although the number varied considerably by location (Table 1). Average size (SUL) of dispersing metamorphs was 30.7 mm (range 22–42 mm; N = 213). The actual number of metamorphs, sub-adults (ca. 45–75 mm) and adults (>75 mm) recaptured was unknown because individuals were not marked. Since there were gaps in the drift fence arrays, any metamorphs captured in outside traps at the end of a drift fence section were still considered to be dispersers; those captured in interior outside traps (N = 15) were excluded from analysis. Therefore, 93% of captured metamorphs were assumed to be dispersers. Given that no inward-bound individuals captured from Dec through March measured < 57 mm SUL (N = 32), there was no indication that any metamorphs returned to the ponds.

In 2003–2004, 95% of all metamorphs were captured by 25 Dec (Fig. 1). Only three metamorphs were captured after 1 Jan, in spite of heavy rains from Jan through March. In 2004–05, 95% of metamorphs were captured by 12 Nov. Similar to the previous year, despite frequent rain from Jan through March, no metamorphs were captured after 30 Dec. In both years, the highest capture frequency occurred during the first significant precipitation of the rain season, even though the magnitude of these events differed markedly (8 mm on 1 Nov 2003 vs. 24 mm on 17 Oct 2004). Precipitation during 2003-04 was 88% of normal while precipitation in 2004-05 was 143% of normal for Carmel Valley, California. These results suggest that the first rains of late summer/early fall, regardless of magnitude, incite dispersal and that most *R. draytonii* metamorphs have left by the end of the calendar year.

The number of captured metamorphs varied considerably between seemingly productive *R. draytonii* breeding ponds. Comparisons of relative abundance to estimate potential recruitment should be viewed with caution, since this study did not target *R. draytonii*. Furthermore, over-wintering *R. draytonii* tadpoles (Fellers et al. 2001. Herpetol. Rev. 32:156–157) were observed at two of the five ponds, and individuals may therefore transform and disperse at nearly anytime of the year when environmental conditions are appropriate. Nevertheless, our data indicates that the first several precipitation events of the fall season incite mass dispersal of *R. draytonii* metamorphs, even at perennial ponds that may appear to provide the appropriate habitat requirements for all age classes. In addition to avoiding predators (including conspecifics), metamorphs presumably disperse to seek appropriate non-breeding habitat until they reach reproductive age and either return or colonize new locations. Our data supports the contention that core-habitat conservation models, which are often symmetrical, may be insufficient for *R. draytonii* and other pool-breeding amphibians that require appropriate movement corridors to ensure connectivity between breeding and non-breeding habitat across a varied landscape (Baldwin et al. 2006. J. Herpetol. 40:442–453; Fellers and Kleeman 2007. J. Herpetol. 41:276–286).

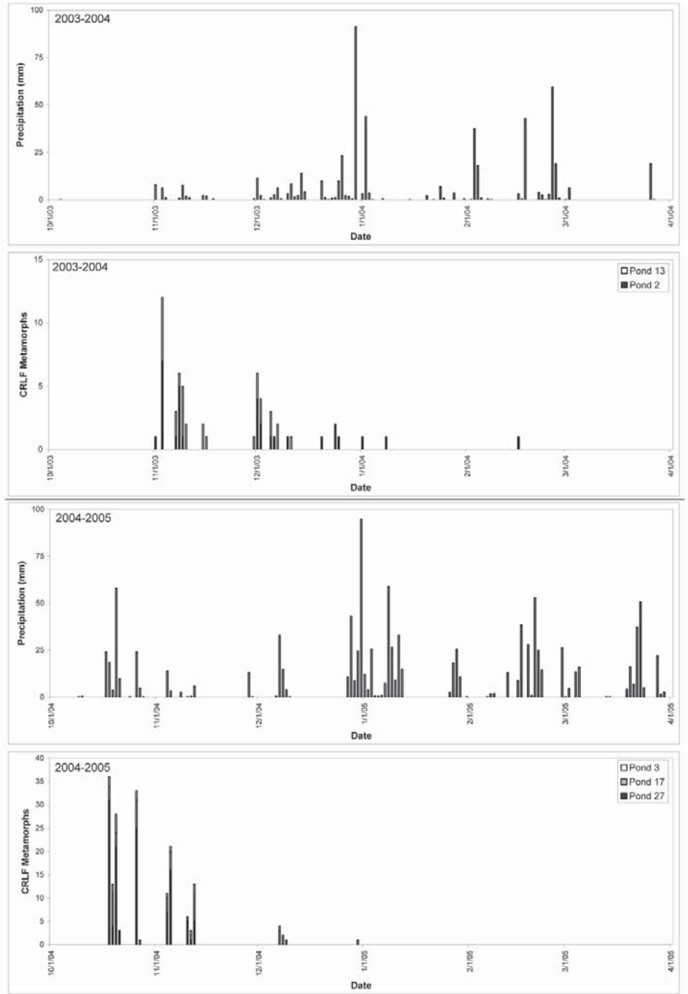

Fig. 1. Precipitation and number of *R. draytonii* metamorphs captured in 2003–04 and 2004–05, Santa Lucia Preserve, Carmel Valley, California, USA.

Table 1. Number of *Rana draytonii* captured in 2003–04 and 2004–05 on the Santa Lucia Preserve, Carmel, California, USA.

Pond #	Season	Metamorphs	Subadults	Adults	Total
2	2003-04	31	0	4	35
3	2004-05	16	2	38	56
13	2003-04	27	1	5	33
17	2004-05	42	12	11	65
27	2004-05	110	0	9	119

This work was conducted under the authority of U. S. Fish and Wildlife Service Endangered Species Recovery Permits and California Department of Fish and Game scientific collecting permits. The Western Regional Climate Center (Reno, Nevada) provided precipitation data from the Carmel Valley station (#041534). We are grateful to the Santa Lucia Preserve for access to the ponds and assistance with installation of the drift fences, and to the Rancho San Carlos Partnership for partial funding of this study.

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RANA DRAYTONII (California Red-legged Frog). **PREY.** Although ranid frogs generally have indiscriminant diets, data regarding vertebrate food items taken by *Rana draytonii* are sparse. Vertebrates documented as prey include *Gasterosteus aculeatus* (Three-spined Stickleback), *Pseudacris regilla* (Pacific Chorus Frog), *Peromyscus californicus* (California Mouse) (Hayes and Tennant 1985. Southwest. Nat. 30:601–605), *Microtus californicus* (California Vole), and *Reithrodontomys megalotis* (Western Harvest Mouse) (Hayes et al. 2006. Herpetol. Rev. 37:449). Although expected, snakes have not been reported as dietary items.

On 13 Aug 2008, at 0030 h, while conducting surveys for *R. draytonii* at a pond in the Sierra Nevada foothills in northern California (Placer Co.), an adult frog (ca. 100 mm) was observed grabbing and quickly devouring a juvenile (ca. 20 cm SVL) *Thamnophis sirtalis* (Common Gartersnake). The *T. sirtalis* had been slowly moving across a flat, muddy bank covered with *Eleocharis* sp., and the *R. draytonii* was situated at the water/mud bank margin, quiescent, facing into ponded open water. Consistent with other feeding observations of ranid frogs (Anderson 1993. J. Exp. Biol. 179:1–12), the *R. draytonii*, upon lunging and grabbing the snake, used its forelimbs to manipulate the snake farther into its mouth. The capture and swallowing of the snake occurred within a period of five to seven seconds and the snake was entirely engulfed within that time. The temperature at the time of observation was 23°C, water temperature was 23.5°C, humidity was ca. 50%, and moon phase was waxing, approaching full.

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RANA PIPIENS (Northern Leopard Frog). **WINTER ACTIVITY**. On 10 Dec 2006 at ca. 1200 h, a *Rana pipiens* was observed on the north shore of Lake Winter located in Northern Wisconsin (45.8°N, 91.1°W). The lake was covered with approximately 2–3 inches of ice, except the occasional narrow opening near the shore. The south-facing shoreline was somewhat undercut from erosion and about 30.5 cm of soil was exposed. While walking out onto the ice from the shoreline a *R. pipens* was observed jumping away from shore and out onto the ice and snow. The *R. pipens* appeared to be rather torpid and its skin appeared rather dry and leathery.

The previous weather was cold, often with maximum temperatures well below the average maximum temperature for those days. On 9 Dec 2006 the temperature increased to a maximum of 1.7°C and then continued to climb to around 4–5°C during the day of the observation, which was mostly sunny. 5.6°C was the maximum temperature that day; two degrees below the 6.7°C record set in 2002 and well above the typical average maximum temperature of -1.6°C (temperature data accessed on-line from www.undergroundweather.com).

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RANA SYLVATICA (Wood Frog). **EGG MASS SURVEYS.** Egg mass counts have become an increasingly popular method for estimating reproductive effort of Wood Frogs in seasonal breeding pools in the northeastern United States. Scientists, conservation organizations, and regulatory agencies use egg mass counts to determine population size and track population trends over time, to identify breeding pools in need of protective measures, and to develop indices based upon biological significance (Couch and Paton 2000. Wildl. Soc. Bull. 28[4]:895–901; Oscarson and Calhoun 2007. Wetlands 27[1]:80–95). Wood Frog ovipositioning typically occurs in communal rafts attached to submerged vegetation at or near the water surface (Couch and Paton, *op. cit.*; Egan and Paton 2004. Wetlands 24(1):1–13; Seale 1982. Copeia 1982[3]:627–635). In many northeastern states, citizen scientists are being trained to assess the ecological value of vernal pools through egg mass counts. Using snorkel equipment for one such survey in Maine, I found that the subsurface view of a large raft of Wood Frog egg masses revealed numerous masses on the pool bottom. Between 0.5 and 1 m below the communal aggregation of egg masses attached to *Ilex verticillata* at the water surface, some masses were clearly attached to submerged vegetation at the pool bottom while others were merely resting on a substrate of leaf litter. During 2009 springtime assessments (27 April–5 May), three pools (Penobscot County, Maine, USA; 44.884°N, 68.688°E; NAD 1983) were found to contain Wood Frog egg masses directly below and around the margins of rafts attached to vegetation near the water surface. There was no lack of attachment sites near the water surface in any of the three pools. Whether they were originally deposited in situ or were secondarily dislodged and came to rest on the pool bottom is unknown. In deep or tannic pools where visibility is poor, egg mass counts may have the potential to underestimate the true number of masses that occur within a pool.

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RHINELLA ARENARUM (Common Toad). **MORTALITY**. Car traffic often results in high amphibian casualties when roads are encountered during breeding or other movements. *Rhinella arenarum* is the common toad in Argentina (Cei 1980. Amphibians of Argetina. Monitore Zoologico Italiano [NS]. Monogr. 2, 609 pp.). In San Juan Province this species is distributed in all wetted areas including the watering systems of towns. On 23 Nov 2008, we counted the toads dead on the streets in Valle Fértil Departament. This region belongs to the Chaco Seco Phitogeografical Province (Cabrera 1994. Enciclopedia Argentina de agricultura y ganadería. Editorial ACME S.A.C.I., 81 pp.). During this time 84 dead toads were encountered on the road in 900 m. All toads were 89 ± 18.8 mm, typical of adult reproductive *R. arenarum*. This is