

**IUCN OTTER SPECIALIST GROUP BULLETIN
VOLUME 7 PAGES 29 - 32**

Citation: Shannon, J.S. (1992) Progress on California Otter Research: 1991 *IUCN Otter Spec. Group Bull.* 7: 29 - 32

PROGRESS ON CALIFORNIA OTTER RESEARCH: 1991

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Abstract: One milestone of 1991 was the completion of my study of otter behavioral development when 60-month-old Scarnose gave birth to her first pups. I finally observed the mechanism for female dispersion. This mechanism turned out to be intrasexual aggression, but unexpectedly this took the form of a near fatal attack on one of Scarnose's pups of one mother by her sister Junior. Followed up by a personal attack on Scarnose by her mother, Mama, this led to Scarnose leaving the area with her pups. Junior, who has already given birth, is positioning to replace Mama as matriarch. One of Mama's surviving female pups, One-Eye, fully integrated into the male Clan, but was also driven away by Junior. Also during 1991, Scarnose survived a near-fatal attack of mastitis, appearing moribund, but overnight opening the enormous abscess and draining it herself, and subsequently recovering. For the first time, a pup was observed voluntarily dispersing rather than being abandoned as is normal. Two new behaviors were added to the ethogram: sleep-nipping and closed-mouthed scream.

Every year that passes, I criticize myself for not having submitted my work for publication, yet every year, it seems, my otter subjects provide me with a dozen or more behavioral surprises that make me thankful I haven't yet committed to print! Fittingly, 1991 was undoubtedly the most eventful year in my ongoing 8-year observational study of the marine coastal otters (*L. canadensis*) at Trinidad Bay, California.

One milestone of 1991 was the *completion of my study of otter behavioral development*. My goal was to follow the 2 females born in 1986 ("Mama Junior" and "Scarnose") through their entire behavioral development to their own parenthood, and that goal was attained in 1991. The year's Big Event, then, was when *60-month-old Scarnose gave birth to her first pups* (a year after her littermate sister first gave birth, and 2 years later than 'the literature' says females of this species become primipara).

In my longitudinal study of the social behavior of this population, one of the last major pieces of the puzzle fell into place in 1991, when I finally observed the *mechanism for female dispersion*. This mechanism turned out to be *intrasexual aggression*, as I had hypothesized, but the form this aggression took was not what I had expected.

In 1990, you might recall. Mama and her primiparous daughter, Mama Junior, joined their families together into a cohesive, 3-generational 'super-family'. This year, I was sure Scarnose was going to have pups too, and I thought, logically, that all of these related females would form a new, larger super-family. But it just was not to be.

In this summer of 1991, now that there were 3 mothers and 8 pups occupying the harbor, there resulted a flurry of aggression among the females, the like of which I had never witnessed before. These formerly 'loving' maternal relatives were now competitors, in obvious conflict.

Understandably, the new mother, Scar, was very protective of her 2 runty male pups, but apparently, she overdid it. Once, I saw Scar attack Mama when Mama approached Scar's family. To reassert her dominance, Mama then attacked Scar. They fought seriously for 30 seconds until Scar yielded, her brow sporting a fresh bite wound. I was stunned. I'd never seen a fight like that between a mother and daughter! Thereafter, Mama rejected her daughter totally, and attacked Scar on sight. Only 3 days later. Scar and her pups were forced to leave Trinidad harbor permanently.

The summer of 1991 was also notable for the frequency with which *mothers bit pups that were not their own*. All mothers bit other mothers' pups, particularly in the presence of food. Junior bit pups the most, Scar the least. This punitive pup-biting continued until the pups were about 6 months old. These bites were sometimes quite severe.

In the worst incident, *Junior almost killed one of Scar's pups* (in Scar's presence!). This attack took place at 20:21: on 26 July, and was apparently triggered by an aggressive vocalization by one of Scar's pups directed at Junior. In response, Junior bit and tore at the pup with full weasel fury for 39 seconds. The attack was so ferocious, I believed at the time that I was seeing the actual killing of a pup. It was, by far, the single most aggressive incident I have ever witnessed here.

First, Junior bit and seized the pup by the back of his neck and literally 'mopped the floor' with him, thrashing him back and forth on the ground. Then, maintaining her bite-hold. Junior clasped and covered the pup, worrying and pulling at his neck with terrific force.

It was only then - over 10 seconds into the attack - that Scar realized what her sister was doing to her pup. Scar put her face between Junior's and her pup, but Junior's rage was not assuaged. At 27 seconds, Scar started biting at her sister, but that only increased Junior's fury. By that time, I was certain the pup was dead. The pup hadn't vocalized at all since Junior first seized him, and the force of the biting and pulling was such that, if Junior actually had the pup by the cervical vertebrae, he could not possibly survive. What finally terminated the attack was when Scarnose mounted Junior. (I have observed that, among these females, mounting is an unambiguous act of *appeasement and submission* to the mounted female.) Junior's power acknowledged, she released the pup and dove away.

I was amazed and relieved to see that the pup had not been killed; Junior must only have had the pup by his scruff. The only physical wound I could see was that the pup's lips were abraded raw pink. Behaviorally, however, the pup was severely traumatized, huddling immobile next to his mother, trembling, eyes wide, staring.

Scarnose took her pups away to a nearby mooring. Soon after, Mama swam by the mooring, and seeing her rejected daughter there, Mama lunged up screaming at Scar, bit her, then continued on her way. For Scarnose, this was clearly The End. With her mother attacking her personally (and gratuitously), and her sister now a deadly danger to her pups, Scar was forced to quit the harbor, and leave her mother and her sister, forever.

Mama had tolerated this daughter to continue to live in her maternal territory for 5 years, but when Scar finally became a mother, Mama rejected and banished her. Why, then, did Mama not reject her other daughter, Junior, when Junior became a mother last year? Perhaps by giving birth first, Junior proved herself the fitter of Mama's daughters, and was thus 'chosen' as Mama's favored offspring.

By the way, at no time did I see Junior attempt to displace Scarnose directly. The sisters were still on 'friendly' terms, it was only that Junior would not tolerate Scar's pups. I still can't get over Junior's savagery toward her own nephews! Seeing how Junior dealt with her own young kin, I cringe to think what fate would befall a strange female's pup (you can forget about adoption, folks!).

After Scar's banishment, Mama and Junior began the process of forming a new super family. In 1991, however, the super-family formed differently than it did the previous summer. In 1990, the super-family began to form only after Mama started 'allowing' Junior and pups to share Mama's den. Mama would then often leave her pups to be watched over by Junior. In 1991, once again, there came a time when Mama tolerated and sought out her daughter, but this time, Junior would take her pups away from a den if Mama's family occupied it. It was only when Junior started 'allowing' Mama's family to live with her family that the super-family began forming this summer. And not only that. Now, often, it was ol' Mom who was being left with Junior's pups to sit. In 1990, then, the super-family was formed on Mama's terms. This year, it was formed on *Junior's* terms.

Currently, in the super-family of 1991, 1 of the pups (a female) belongs to Mama (she lost a male and a female pup in August), the other 3 (2 females & 1 male) are Mama's grandpups by Junior.

Aggression may have increased among the females this year, but aggression between the sexes decreased sharply. During 1991, *there was a noticeable relaxation in the social segregation of the*

sexes operating in this population. This year I saw by far the highest number of amicable incidental interactions between adult members of the Family and Clan. Also, it has now been 2 years since I saw a serious fight between any adult females and adult males (excepting estrus). This tendency toward peaceful coexistence is probably due to the fact that, ***of the 12 otters resident at Trinidad in 1991, all but 3 were now known descendants of old Mama*** (the highest degree of relatedness I've observed in this population).

Despite the high level of interpersonal familiarity now present, however, the general social barrier between adult females and adult males remained rigidly intact. Witness: as of the end of 1991, it had then been 1,326 sessions (9/9/86) since I've seen an adult male and an adult female simply forage together, and 994 sessions (9/6/88) since I've seen playful behavior between adults of the opposite sex.

One of 1991's brighter stories was in keeping with this new harmony between the sexes: ***a yearling female became a completely accepted member of the male Clan!*** For the first time since the litter of 1986, a female pup of Mama's survived into her second year of life. Just like the Sisters did after Mama left them as yearlings, little "One-Eye" joined the Clan for a short time (apparently, it isn't until males and females become adults that they stop mixing company). One-Eye, however, became a much more integral member of the Clan than the Sisters were.

Jus! by watching the way the males and One-Eye interacted, it was obvious that the males welcomed and encouraged the company of this little female. The males let her forage with them, share their food, groom and play with them, and den with them. One Eye was literally 'one of the gang'. It was truly extraordinary to see a year-old female accepted as a full member of this usually exclusively male social club. Twice, I even saw One-Eye leading the whole Clan as they swam into the harbor. Now, that was really something special!

Unfortunately, One-Eye is gone now, too. After Junior returned to the harbor with her new litter in late Spring, Junior began attacking One-Eye, and by mid-July, One-Eye had been run off, seemingly for good. She couldn't even live with her male buddies anymore. Junior tolerated the males to live at the harbor, but obviously not her own mother's younger daughter. I know One-Eye's OK, though. In early October, the super-family was absent from the harbor for about a week, and one day, here was little One-Eye, back for a visit! Evidently, Mama and Junior went to wherever it was that One Eye had set up her own home, and One-Eye was evicted during the super-family's stay.

(Incidentally, One-Eye *does* have both of her eyes. When she was 3 months old, she injured her left eye, which turned bluish white. That eye injury became her most noticeable identifying mark, and thinking she might've lost sight in it, I started calling her "One-Eye". After a few weeks, her eye healed with no apparent sight loss, but I kept the name, anyway.)

So it was in 1991 that 2 females were forced to disperse from Trinidad harbor. Scarnose was forced out principally by her mother. Junior, on the other hand, made war on her sister's pups and her mother's yearling daughter. In so doing, Junior effectively positioned herself to be the 'heir apparent' to her mother's maternal territory. This year, although Mama continued to be the obvious leader and matriarch of the super-family, it became just as obvious that the true 'power behind the throne' and 'enforcer' of the maternal territory was now Mama Junior.

Other highlights from 1991:

Scarnose battled a near-fatal attack of mastitis. Beginning about 14 July, Scar's right rear mammary gland developed an abnormal swelling. The infected mamma was swollen medially; the nipple hypertrophied. The mastitis progressed rapidly. In just 4 days, the infection very nearly took Scar's life.

From 15-18 July, Scar lost at least 1/4 of her body weight, lost the effective use of her hind legs, and became so lethargic that she was unable to feed herself or her pups. (I had to break my rule of non-interference and feed the pups, who were forced to live on one of the docks scavenging fish scraps left by the adult otters.) As she sickened, Scar even prevented her pups from living with her. Capturing and treating Scar was hopeless. By the time I recognized the gravity of her illness, she was already too weak to survive the stress of capture. No. As difficult as it was, all I could do was to remain the objective observer, and watch her slip away. It was sad. Scarnose was so moribund during the evening of 18 July, I was certain she would die that night.

Incredibly, however, the next day, Scar had opened the abscess herself, and over the next 2 days, she excavated out all the fatty tissue in that infected mammary capsule! The resulting wound was truly cavernous - a circular excision about 5 cm in diameter, and about 2 cm deep. Despite that frightful gouge in her belly, though. Scar was back in relatively good health less than 24 hours after she opened the abscess. The last time I saw her wound was 3 days before she was forced out, and it was doing very well - bright pink with no bleeding or sign of infection - and living as she does in a salt water habitat, Scar's wound was being irrigated constantly with a natural saline solution.

By 24 July, Scar had 100% of her energy back, and she was actively chasing down live fishes to present to her pups. I last saw Scarnose and her pups on 26 July. Unfortunately, since she probably took her family away for good, I may never know how her amazing self-performed surgery turned out. I was optimistic Scar would recover, though. She was always such a plucky little runt! (Actually, there is a chance I might get to see Scarnose this Spring around estrus when the adult females are 'on the move', away from their usual home territories.)

Also in 1991, I recorded the first instance of a *pup achieving independence by voluntary dispersion*, as opposed to the usual process of *maternal abandonment*. Junior's male pup from 1990 left the otherwise all-female super-family to join the male Clan in January 1991 - a full month before his mother left Trinidad harbor. Once again, in the current super-family of 1991, there is a male pup with no male siblings, and it appears this male ("Giant Pup") will leave the super-family early, too. As early as 10 December, I saw Giant accompany the males for an entire foraging trip, during which he also engaged in a long mutual grooming session with 2 of the males. Since foraging and grooming together are necessary requisites to the formation of affiliational bonds between otters of this population, it appears that Giant is already bonding with the Clan males - and vice versa.

Speaking of the Clan, *of the 7 adult males in the Clan in 1987, only 2 remained in 1991*. One male that disappeared in 1991 was old "Moustache", the first Clan member I learned to identify by sight. Visibly aged, Moustache was likely the oldest otter in the population. It appears that distinction is now Mama's (I estimated that she was 10 or 11 years old in 1991).

Finally, some interesting new behaviors added to my ethogram in 1991:

"*Sleep-nipping*" was seen once when 4 males slept in a pile; an otter would suddenly nip the napper next to him. Nips tended to occur when an otter shifted position in the sleep-pile. Most times, a nipper had his eyes closed, as though 'half-asleep'. Nipping usually did not stir the one thus nipped, but once, a nipped otter nipped back (neither opened his eyes during the exchange of nips).

After Mama and Junior united in their super-family, a soft "*closed-mouthed scream*" of escalating pitch was sometimes emitted by a mother solicited for food by a pup that was not her own. The closed-mouth scream appeared to be a warning given in lieu of a punitive bite; this vocalization effectively deterred further solicitation by an errant pup. This type of screaming was also witnessed in another novel context. Only twice this year did I see adult females groom males. During one of these brief encounters, Junior, displaying obvious conflict, screamed softly into the male's fur as she groomed him!