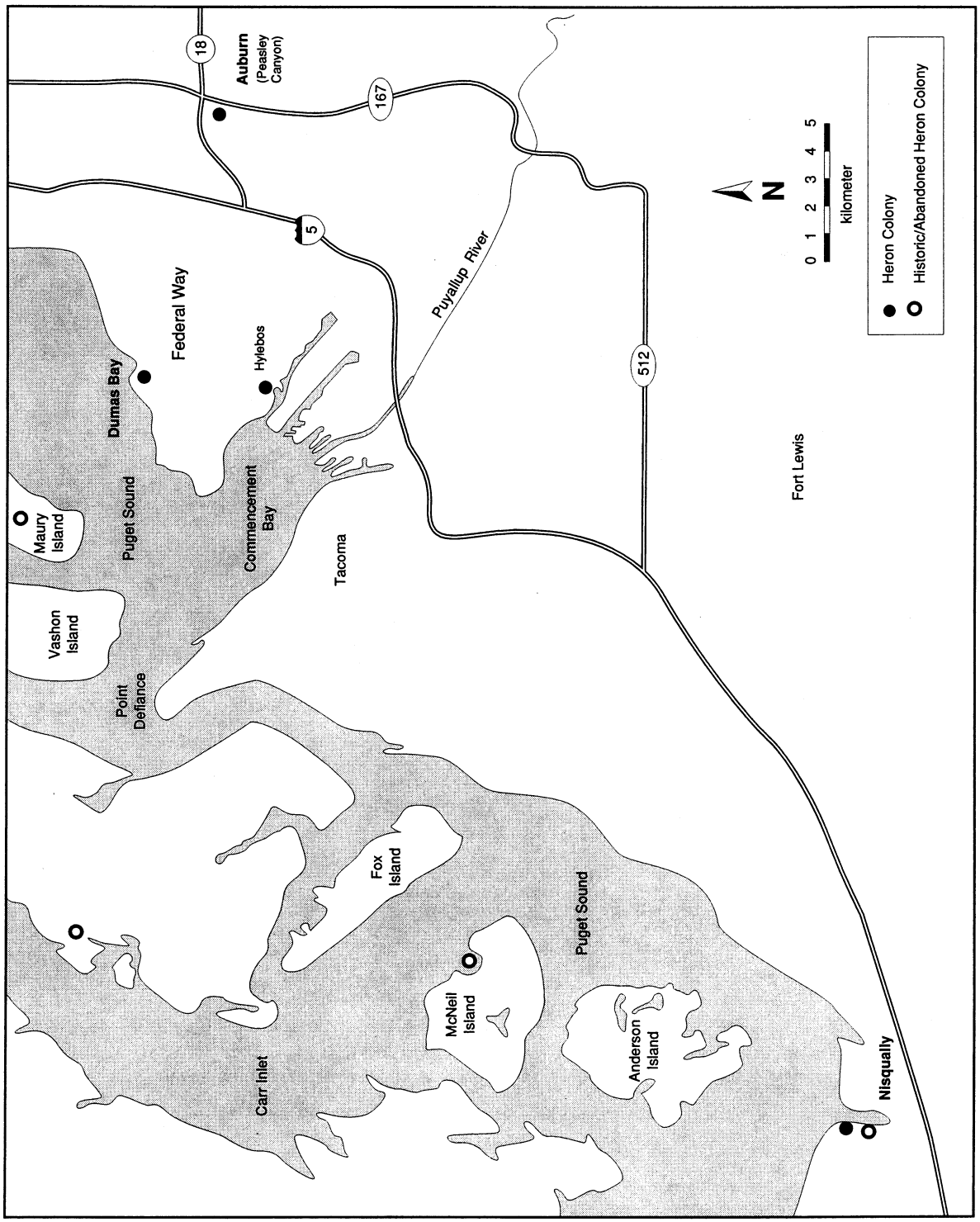

Figure 12. Great blue heron colony locations in and near Commencement Bay in 1997 and historically.

The ability to sex individual herons could not be accomplished since the optical scale for measuring beak size (radicule) could not be secured in time for the study. However, information gathered from Bennett (1993) and Butler (1993, 1995) regarding caloric intake requirements to begin egg production in female herons, links the association of nest initiation with the available number of hours of low tides in the Spring. This would indicate that the majority of contaminant loading potential would likely be related to marine forage sites instead of the inland locations utilized early in the season by female herons. Therefore, the inability to sex the birds in this reconnaissance study component was not considered to be problematic.

Gathering time allocation data became overly burdensome due to the enormous amount of observation hours required to record time intervals when herons returned to the nest during the morning hours. However, data obtained from this monitoring study yielded results that were deemed useful in the overall effort to preliminarily assess avian injury in Commencement Bay. A significant number of great blue herons (at least half from the Dumas Bay and Hylebos heron colonies) were observed using forage sites in Commencement Bay and therefore had the potential to be exposed to elevated levels of contaminants associated with the industrial waterways **(Figure 13).**

C3.1 Dumas Bay Colony - Productivity and Forage Site Selection

Monitoring at the Dumas Bay colony revealed late incubation (when compared to previous years), poor synchronization, and continuous harassment by bald eagles. Observations between early February and late May noted eagles in or near the colony on almost every occasion, and likely the most probable cause for the colony's ultimate failure and abandonment in 1997. By late May, only one nest remained active, fledging two chicks from a total of **16** once-active nests. A similar result occurred in 1995[4] when casual observations of the colony (Norman unpublished data) recorded only a few chicks present with fledging occurring late into the season **(Figure 14).**

Productivity trends observed from 1984-1997 (Norman, unpublished data) indicate that herons from the Dumas Bay colony have had consistently lower productivity rates than other nearby heron colonies **(Figure 15).** Levels of productivity measured at the colony continue to be consistently below that which would be necessary for the colony to maintain itself (1.7 young per active nest from Henny 1972 and 1.9 young per active nest from Butler *et al.* 1995).

Observations between March 8, 1997 and May 1, 1997 at the Dumas Bay colony recorded 250 arrivals and departures of which 47% were confirmed as using forage sites in Commencement Bay **(Figure 16).** Because of the colony failure, no other information was collected.

[4]Data other than "casual observations" are not available for the Dumas Bay Colony in 1995, and therefore not included in the figure.

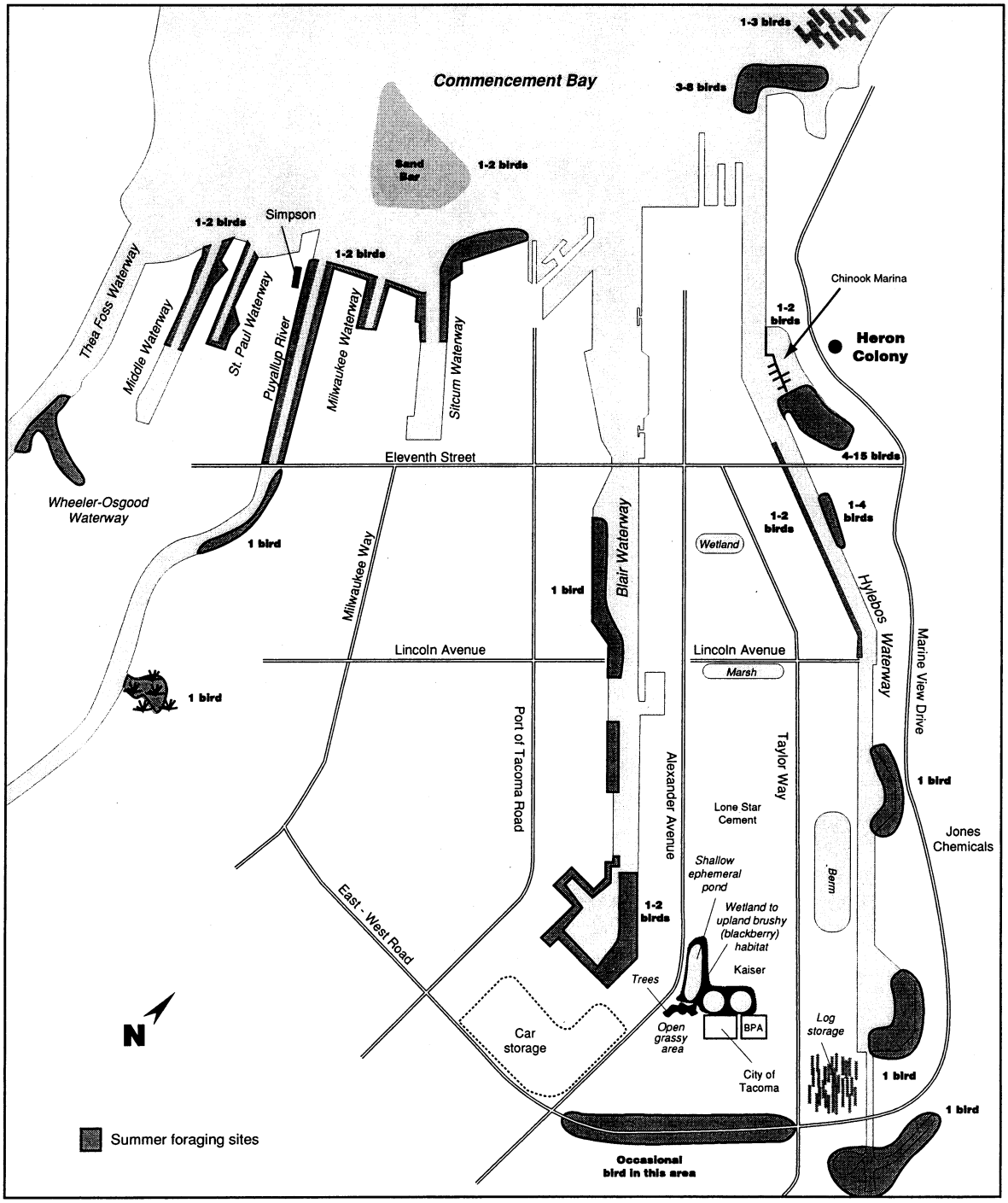

Figure 13. Primary summer foraging sites utilized by great blue herons observed in Commencement Bay in 1997.

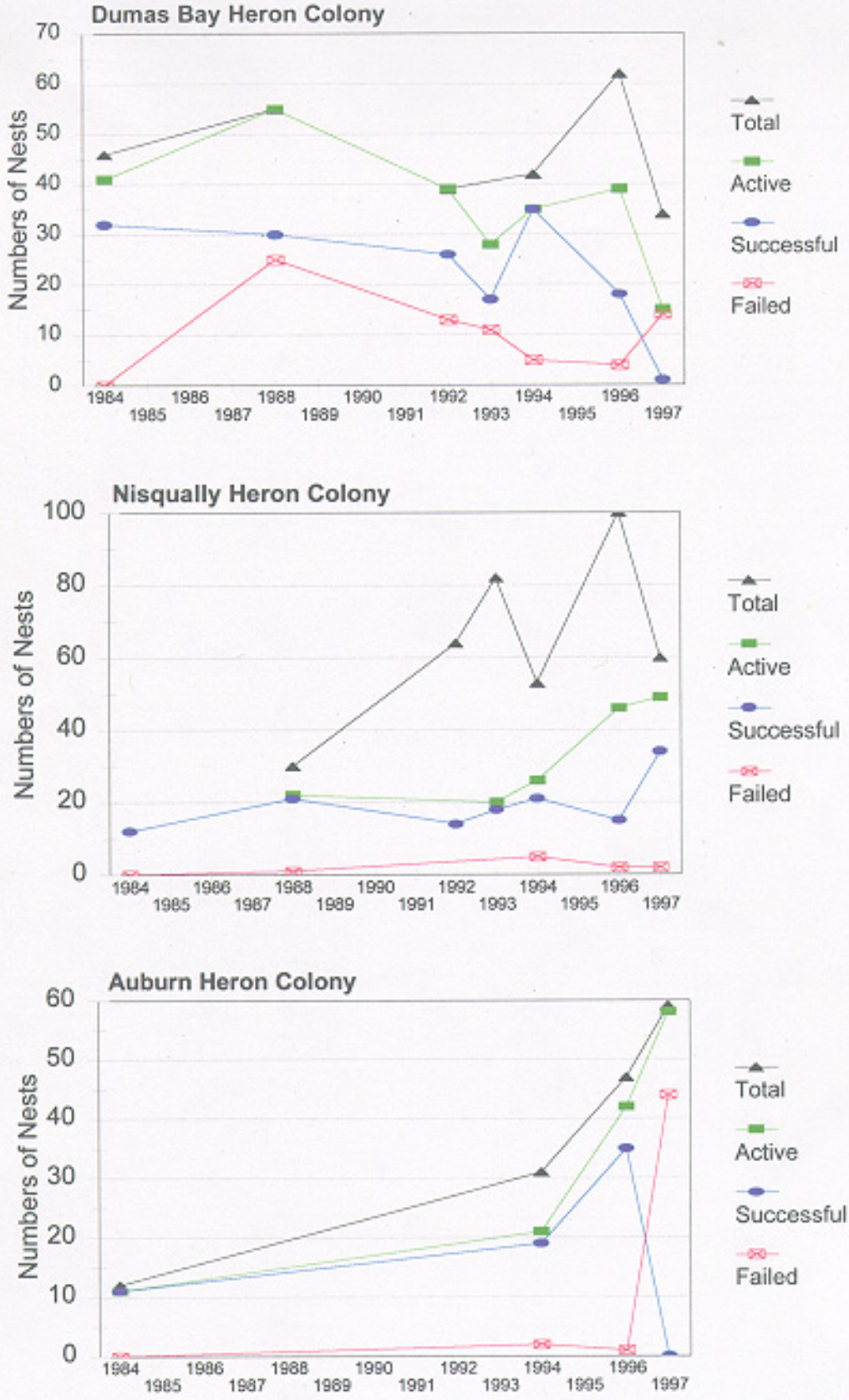

Figure 14. Nesting observations from the Dumas Bay, Nisqually, and Auburn great blue heron colonies,1984-1997.

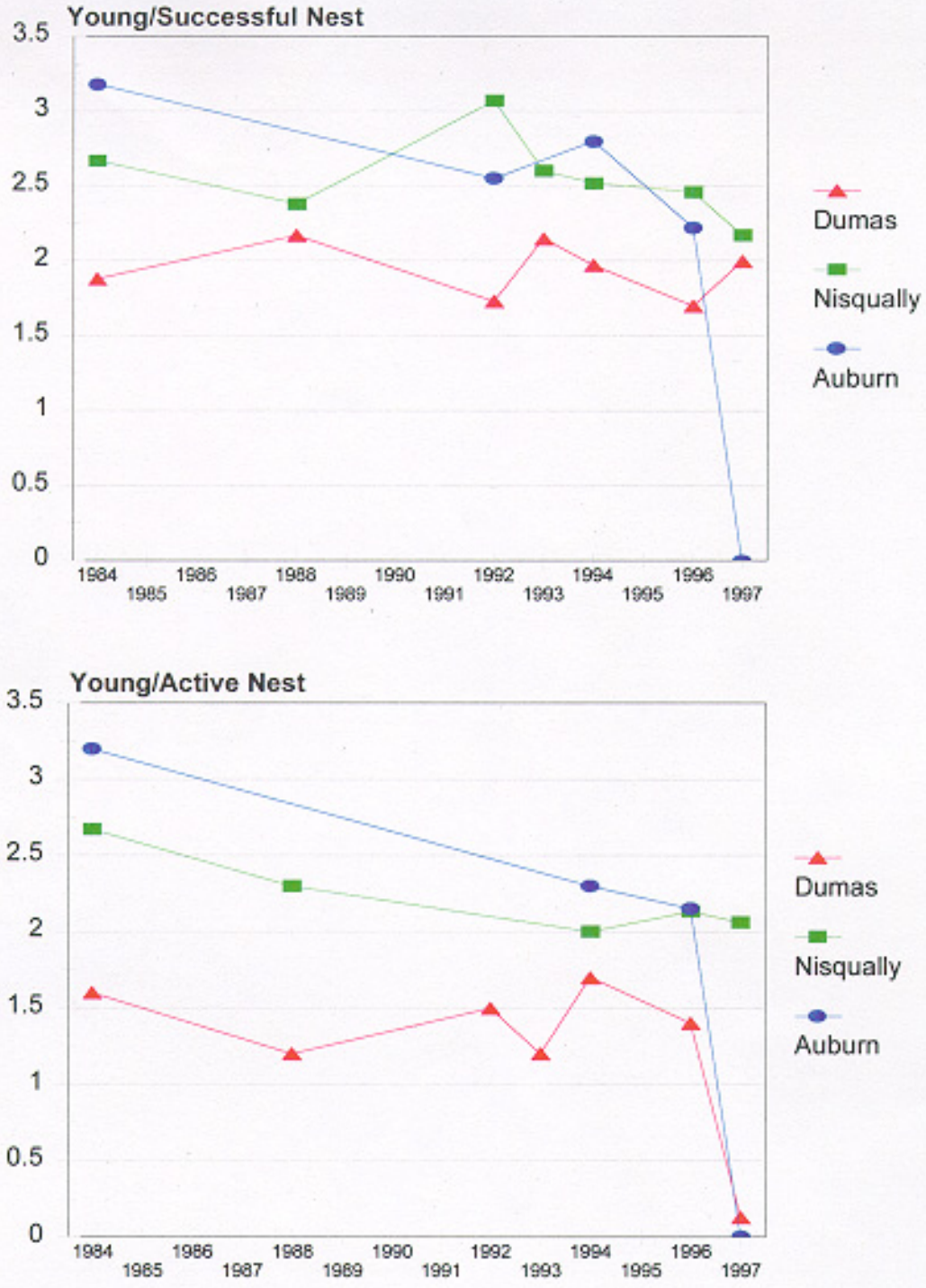

Figure 15. Productivity of the Dumas Bay, Nisqually, and Auburn great blue heron colonies by numbers of young per successful nest and numbers of young per active nest, 1984-1997.