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Using Population Mechanics in Management Schemes

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USING POPULATION MECHANICS IN MANAGEMENT SCHEMES[1]

by

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I. Why do we try to manage natural systems?

    A. Dissatisfaction with the status quo.

        1. Man left the caves and developed agricultural pursuits to overcome insecurity of natural events.

    B. Related to values and the level of existence desired by society.

    C. No longer a question of managing, but rather at what level and for what purposes.

        1. What are our needs and values?

        2. And what are our objectives?

II. A Wildlife Management Perspective.

    A. A range of activities ("continuum") related to objectives and values.

        1. Artificial propagation

        2. Habitat improvement

        3. Removal of competitors

        4. "Leaving things alone"

        5. Regulated exploitation

        6. Removal of obnoxious individuals

        7. Habitat destruction

        8. Extirpation of populations

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[1] Great Plains Extension Wildlife Damage Control Workshop at Kansas State University, Manhattan, Kansas, December 11, 1973.

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B. Management objectives vary from place to place and from one point in time to another to match differing values, changing situations, and compatibility of species with other land use objectives.

C. Competency of a manager should be measured by his ability to respond appropriately over the entire spectrum of management potential.

    1. Sensitivity to public and private values.

    2. Awareness of existing conditions.

    3. Knowledge of environmental relationships.

    4. Understanding ramifications and repercussions associated with techniques at his disposal.

III. The challenge of managing carnivores.

A. The "uni-cultural value" associated with predators in days gone by has blossomed into the grossly divergent values that various segments of the public assign to them now....perhaps greater than for any other group of species.

B. The values associated with carnivores are largely emotional (generally intensely so). These values are a luxurious by-product of a society fortunate enough to be insulated from the struggle for food and protection from the elements.

C. Our knowledge of biological relationships involving carnivores is pitifully small, resulting in a proliferation of "assumed" relationships (frequently ending in a circular logic with values influencing the assumed relationships which serve to reinforce the values).

IV. Does predation really occur?

A. Coyotes were endowed with 42 teeth to make a living. Their continued existence testifies to their ability to use them.... successfully!

B. But do they kill sheep?

    1. Categorically -- yes! But the real question is "to what extent?"

    2. Current studies suggest an _average_ summer loss to coyotes of 2 - 5 percent among range operators. In the face of existing coyote control efforts. Some operators experience substantially greater losses.

    3. Question of how large would the losses be in the absence of coyote control. Scattered impressions suggest it may exceed 20 - 25 percent of the flocks.

C. Thus far we have only looked at this as a coyote-sheep equation.

   1. How about the carnivore-game trade-offs?

   2. Do we have interests in influencing trade-offs among
       carnivores where inverse relationships seem realistic
       (e.g. coyote-bobcat, or coyote-fox)?

V. Historically we have been faced with depredation problems and have
    been unable to resolve them <u>when</u> and <u>where</u> they arose. We reacted
    by:

   A. Backing up in time--more specifically we tried to prevent the
       depredations by removing the potential culprits before the
       damage occurred.

   B. Backing up geographically so we could "get to them before
       they got to us."

   C. And ended up with broad programs of population reduction
       (and where was our biological input?).

VI. There have been vast changes in public sentiment and values.

   A. In the name of Environmental Quality (I disdain "ecology") there
       has been an assumption that what is "natural" is good and that
       everything would be fine <u>if</u> we would leave it alone.

   B. Instead, the real question concerns the degree to which we are
       willing to modify the environment to our liking and the degree
       of modification we will accept.

   C. There is no one universal objective, but rather different
       goals for different areas.

      1. Acknowledging the potential inherent to individual areas.

      2. Recognizing the interestes of the people associated with
          those areas.

   D. Changing values led to public pressures resulting in the
       Executive Order banning use of toxicants as predacides on
       federal lands and the EPA edict restricting interstate shipment
       of specific chemicals as predacides.

      1. Was environmental contamination and hazard to non-target
          species really the issue?

      2. Or was it objection to large-scale programs of population
          reduction of carnivores as means of resolving depredations?

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VII. Let's look at some biological inputs (coyotes).

    A. A few population parameters.

        1. Density

        2. Reproduction

        3. Mortality

        4. Movements

           a. home range

           b. dispersal (emigration and immigration)

    B. Annual cycle of abundance--stable environment (assumes the population returns to about the same level at comparable periods in the annual cycle).

        1. Lowest density occurs immediately prior to whelping.

        2. Whelping (reproduction) effectively doubles or triples the number of individuals.

        3. Assumption of stability dictates a "loss" back to level of origin prior to next whelping season.

           a. mortality

               (1). unexploited populations-- 50-65 percent on annual basis.

               (2). causes are generally not known.

               (3). assume much of it occurs in fall and early winter (pre-breeding season).

           b. dispersal

               (1). generally characteristic of young (juvenile? individuals seeking to "establish" themselves.

               (2). Assume it is primarily a fall and winter phenomenon in coyotes.

        c. Implications for management (=control for our discussion here).

        1. Need to define problem in biological terms.

           a. general population reduction.

           b. local problems of short duration.

c. perennial problems in high value "crops".

   d. infiltration into high risk areas ("buffer zones").

VIII. Additional comments on meeting the problems when and where they occur.

   A. Use of toxicants as predacides is currently banned on federal
       lands on the basis of environmental contamination and/or hazards
       to non-target species.

       1. Environmental contamination has not been effectively demon-
           strated for properly used predacides.

       2. The applications (methods of use) of toxicants generally are
           more important in determining selectivity than chemicals
           themselves.

           a. M-44 device appears 90-95 percent selective for coyotes.

           b. 1080, as used, did not exploit its selective toxicity.

           c. Concept of a toxic collar to protect livestock (specific
               for the individual causing the damage).

   B. Was the ban on toxicants really an objection to attempts at gross
       population suppression?

       1. If so, then similar restrictions in use of aerial gunning
           programs, etc. might be equally possible...particularly where
           these techniques are used for this purpose.

       2. Points up the need to identify program objectives in
           biological terms and work in ways that are compatible
           with the system to resolve resource problems.

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