

PI Name / Short Description: King Rail (RAEL) - preferred breeding habitat coverage (Lake Ontario) [E11]

Technical Workgroup: Environmental TWG

Researched By: Lantry, Schiavone

Modeled By: LTI (DePinto, Redder)

Performance Indicator Metric: Basin level area estimate of the annual cover of preferred breeding habitat (ha).

Ecological Importance/Niche: King rail is designated as Threatened by New York State Department of Environmental Conservation (NYSDEC), Endangered by Ontario Ministry of Natural Resources (OMNR), the Committee on the Status of Endangered Wildlife in Canada (COSEWIC; Schedule 1), and the Species at Risk Act (SARA). Protecting the ecosystems of vulnerable, threatened, and endangered species is essential for species survival and the conservation and protection of biological diversity.

Temporal Validity: 2nd quarter of May through end of July.

Spatial Validity: Valid for Lake Ontario, where appropriate breeding habitat exists. Annual preferred breeding habitat coverage is simulated for “typical” open and protected embayment wetlands. “Typical” open and protected embayment wetlands are characterized by bathymetry/topography and vegetative community responses that are intended to be representative of the entire collection of open and protected embayment wetlands on Lake Ontario (see calibration data). The generalized plant community and elevation models are assumed to be representative of all coastal wetlands of each geomorphic type located within all the Lake Ontario shore units and the Upper St. Lawrence RIV 1 shore unit (see Calibration Data). As such, the model outputs are extrapolated to a complete coastal wetland database for Lake Ontario and the Upper St. Lawrence River to obtain a basin level annual estimate of preferred breeding habitat.

Hydrology Link: Water level regulation could change the availability of preferred breeding habitat in open and protected embayments. Predictions of this PI are generated from the wetland plant model developed by Wilcox and Ingram. Wetland plant community evolution is strongly dependent on the hydroperiod (i.e., flooding and dewatering history) at a particular elevation.

Algorithm: The wetland plant model uses flooding and dewatering intervals at specific elevations based on a 0.05-meter (approx. 2 inch) interval between 73.25 (240.32 ft) and 75.75 meters (248.52 ft) (IGLD85) to assign vegetative structural types to elevations on an annual basis. The wetland plant model is based upon field sampling completed for the IJC study (see wetland vegetation PI descriptions and reports for additional details).

Calibration Data: See wetland vegetation PI descriptions (by Wilcox and Ingram) for complete description of calibration data. Vegetation quadrat data (7 transects) and

bathymetry/topography surveys for 8 open embayment (Hay Bay Marsh, Robinson Cove, South Bay Wolf Island-Button Bay, Braddock Bay, Black River Bay, The Isthmus, and Eel Bay) and 7 protected embayment (Parrott Bay, Hill Island East, Wolf Island-Bayfield Bay, Presqu'ile Bay Marsh, North Pond, Point Vivian Bay, and East Goose Bay) wetlands. Black River Bay South, an additional protected embayment site, was identified as an outlier and therefore excluded from the data analysis.

Validation Data: Wetland vegetation mapping from historical aerial photography of the study sites were used to validate wetland vegetation model predictions of general habitats (e.g. meadow marsh). No data is available to validate predictions of king rail breeding habitat.

Documentation and Reference: See the wetland vegetation PI descriptions (by Wilcox and Ingram) for documentation and references specific to the wetland vegetative model. Vegetation used as preferred breeding habitat was determined from peer reviewed published literature and databases (e.g. NHIC, NYNHP, and the NYSDEC Breeding Bird Atlas).

Lantry, J.R., A.X. Schiavone, J.M. Farrell. 2005. Impact of water level regulation on habitat availability for species-at-risk associated with nearshore areas of Lake Ontario and the upper St. Lawrence River. IJC final LO-USL SAR technical report.

Risk and Uncertainty Assessment:

This PI is based on the following assumptions:

- Abundance and distribution of SAR are currently limited by available preferred or required habitat;
- Literature provides accurate information on life history and habitat needs and preferences;
- Habitat and/or vegetative structural type designations are comparable to the designation as determined from the vegetative sub-model;
- The vegetative sub-model allows us to predict quantitative changes in habitat for each water level scenario;
- Actual required habitat is a proportion of the predicted habitat;
- Evaluation of habitat change, as determined by change in the area of preferred or required habitat, is a valid method to assess positive or negative impacts to a SAR;

Some uncertainty is associated with all of the assumptions made in development of PIs. Despite this uncertainty, species-at-risk must be considered in the decision making process. Protecting the ecosystems of vulnerable, threatened, and endangered species is essential for the species survival and conservation and protection of biological diversity. The U.S. and Canadian federal governments, Province of Ontario, and State of New York have many laws written to protect wildlife and to prevent or minimize damage to critical habitat. Any decline in the availability of habit for species-at-risk is potentially significant in terms of the sustainability of the species or its habitat. The species-at-risk

PIs will aid in evaluating the impact of proposed water level regulation scenarios on critical habitat.

Significance, Uncertainty and Sensitivity:

1) Significance Rating: King Rail has declined dramatically in the northern part of its range (e.g. Great Lakes Region). This species has been reported from three wetland areas along the New York and Ontario shores of Lake Ontario. In Ontario, king rail seems to prefer shallow-water marshes with abundant vegetation that merge with scrubby swales. King rail is listed as endangered by OMNR, COSEWIC and SARA and as threatened by NYSDEC.

2) Uncertainty: The uncertainty associated with each of our assumptions and includes (but is not limited to):

- The suspected distribution of each species is only as good as available occurrence information;
- We assume that species are currently limited by available habitat. Conversely, even if the IERM predicts a certain amount of available habitat for a given species, that species may only be able to occupy a portion of that habitat for a number of reasons (e.g. proximity to humans, wetland complexity, pollution, faunal wetland species composition and diversity, etc.);
- Information on life history and habitat needs and preferences as determined from literature review may not be complete;
- There may be uncertainty with how the forcing functions (i.e. water level) interact with habitat;
- There are uncertainties associated with the vegetation sub-model, which is used to predict habitat availability (ha), and should be addressed by Wilcox and Ingram;
- SAR are impacted by many factors in addition to habitat availability, including: habitat quality, prey quality and availability, weather, predation, inter- and intra-specific competition, etc. These factors likely interact with changes in water level (e.g. increased nest predation with decreases in water level).

3) Sensitivity: King rail is retained as a key PI because its habitat is sensitive to alterations in water levels and flows