

# ROS Methods for Peaceful Enjoyment

## RSEA

### 1. Background

In the 1990s, the *Forest Act* and the *Forest Practices Code of British Columbia Act* set out mandates to develop and maintain an inventory of wilderness and recreational areas. The Province modified the US Forest Service recreation opportunity spectrum approach (United States Forest Service, 1982) and developed the provincial Recreation Opportunity Spectrum (ROS) Inventory. This inventory characterized and represented recreational opportunities as combinations of settings and probable experiences arranged along a continuum or spectrum of ROS classes. The Province continues to maintain and use the ROS to support land-use planners and resource managers in making decisions on appropriate land uses, resource development objectives, and management prescriptions.

The recreation opportunity spectrum was first developed by the US Forest Service in the 1970s to help manage forest service lands for recreation (United States Forest Service 1982; Clarke and Stankey 1979). Since then, it has been used in planning processes around the world (Cervený et al. 2011). Land-use planning approaches, such as Limits of Acceptable Change, Visitor Experience and Resource Protection, and Visitor Impact Management and Place-based Planning, have adopted ROS as an analytical tool (Stankey et. al. 1985; Nilsen and Tayler 1997; National Parks Service 1997; Carr 2004; Department of the Interior 2011; Groot 2011; RAMSAR 2012).

**Table 1. Recreation Opportunity Spectrum (ROS) polygon and delineation factors (from BC Ministry of Forests 1998)**

Remoteness	Naturalness	Social experience
<b>Distance from road</b> – approximate distance from the nearest road (km).	<b>Motorized use</b> – degree of motorized use within the area (includes off-road, boat, and air access vehicles).	<b>Solitude/self-reliance</b> – opportunity to experience solitude, closeness to nature, self-reliance, and challenge.
<b>Size</b> – approximate size of the area (ha).	<b>Evidence of humans</b> – on-the-ground evidence of restrictions and controls, facility development, site modifications, and site or trail degradation.	<b>Social encounters</b> – number of interactions with others and expected party size.

### 2. Methods

The Peaceful Enjoyment Working Group (WG) expanded the input data for the ROS analysis to incorporate additional features particularly relevant to northeast BC. The modifications (see Appendix 1) included:

1. Adding private land to the analysis.
2. Adding pipelines to the semi-primitive motorized (SPM) category. The US Forest Service (USFS) ROS revised standards (2003) and Moore et al. (2003) considered these features in the semi-primitive non-motorized category (SPNM), but the WG decided to include them in SPM because motorized vehicles generally use these linear features.
3. Including facilities ancillary to oil and gas in the semi-primitive motorized (SPM) category.
4. Including seismic and TRIM data – the analysis considers these features and differentiates between them based on their potential to be used as a motorized linear

feature (SPM) or non-motorized linear feature (SPNM). The differentiation was done in two steps:

- i. A desktop analysis of the RSEA disturbance layer (2018) was carried out for seismic and terrain resource information management (TRIM) features less than 1.75 m in width and with specific cut types (gravity/aeromagnetic – “GRAV”, new hand cut – “NHC”, existing hand cut – “EHC”), representing the SPNM, while the rest of the features fall into the SPM. The rationale for removing hand cuts and gravity/aeromagnetic from seismic datasets is based on minimal or zero disturbance on the ground.
  - ii. A 2017 review of satellite images of seismic lines under SPNM and SPM on the composite RSEA study area established that the desktop analysis was accurate in separating the features with motorized potential from the ones with no motorized potential.<sup>15</sup>
5. Including transmission lines in SPM. The WG observed that motorized vehicles use these linear corridors.
  6. Including rail lines in the roaded modified (RM) category.
  7. Including mining in the roaded modified (RM) category. For lack of a more refined data set, tenure information was used. This results in a very conservative approach because many tenures are sold but never developed.
  8. Including past forest harvesting in the semi-primitive non-motorized (SPNM) category. Road buffers leading to the harvested patches may already cover their area because of the road buffers used.
  9. Census data (population density) was used to inform the threshold between the urban and rural categories. Urban is defined as a population of >1000 and population density >400/km.<sup>2</sup> The WG decided to remove district municipalities that are not representative of an urban area according to the population density definition, including the Northern Rockies Regional Municipality, District of Tumbler Ridge, and District of Hudson's Hope.
  10. Including the footprints of existing and approved major projects.
  11. Including recreational features (e.g., sites and trails) accordingly into the SPM or SPNM categories.
  12. Including areas of parks and protected areas, as well as water features, to obtain a continuous spectrum of all seven ROS categories.

### 3. References

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## **APPENDIX 1:**

### **Description of ROS categories**

The objective in the creation of an updated ROS dataset (ROS 2020) was to stay as true to the original 1990 dataset theme as possible. The updated dataset also had to be able to be replicated for future iterations with as little manual intervention as possible and using a common disturbance layer for the northeast part of the province (i.e., the RSEA disturbance layer).

The following ROS classes/categories were created using a process of elimination beginning with the most disturbed category, Urban, and proceeding to Rural then Roaded-Modified and so forth. The ROS classes that were created are as follows:

#### **Urban (U)**

- *This class is dominated by urban development such as roads and buildings.*
- *There is generally little natural vegetation and a significant amount of ornamental plant material.*
- *There are very high interactions among users and a very high evidence of other users.*
- *There is a very high level of vehicle use and recreation facilities are usually highly developed. This class is used to identify urban and suburban areas.*
- *This ROS class is rare in forest settings.*

For the Urban classification, the Demographics, Income and Labour Summaries for BC Census subdivision was utilized. This layer has population data from 2016 Stats Canada.

The population density had to be equal to or greater than 400 people per square kilometre and requires a population size of 1000 or more people. Large municipalities that were administrative districts and not representative of urban/rural areas were removed. This included the Northern Rockies Regional Municipality, District of Tumbler Ridge, and District of Hudson's Hope.

#### **Rural (R)**

- *Rural is dominated by human development associated with agricultural land or rural settlements.*
- *There are numerous roads and structures. Patches of natural vegetation are present.*
- *There are high interactions among users and high evidence of other users.*
- *Generally, a high level of vehicle use.*
- *Recreation facilities are usually well developed. This class is used to identify agricultural and rural residential areas and highway corridors.*

The Demographics, Income and Labour Summaries for BC Census subdivision was also used to derive the Rural classification. Only district municipalities and cities with population densities greater than five people per square kilometer and not already in the Urban dataset were considered. Note that this rural classification may only be applicable to the RSEA study area and the RSEA project.

The rural area also incorporated private land parcels greater than 500 hectares. Private parcels have a title registered to an individual or a private corporation/institution (e.g., financial institutions, churches, universities, hospitals, strata corporations, etc.)

#### **Roaded-Modified (RM)**

- *This class is modified, usually by logging or other resource extraction activities (e.g., mining, gravel pits, hydro lines and dams, oil and gas, and seismic lines).*
- *There are moderate interactions among users and moderate evidence of other users.*
- *The type and level of motorized use can vary significantly (from highway to off-road vehicles), and recreation facilities are usually more developed than in the semi-primitive areas.*

- *This class is similar to Roaded-Natural, except it is more modified.*

The Roaded-Modified data class was derived from a 1-kilometre buffer from the centrelines of the following datasets (total width = 2 km):

- Active forest tenure roads.
- Roads from the Digital Road Atlas that fell into the following classes:
  - Alleyway
  - Driveway
  - Freeway
  - Highway
  - Pedestrian
  - Ramp
  - Strata
  - Arterial
  - Collector
  - Local
  - Service
  - Lane
- Petroleum access and permanent roads from the Oil and Gas Commission layer (TR\_ROAD\_WHSE\_MINERAL\_TENURE\_OG\_ROAD\_AREA\_PERMIT\_SP) that had no deactivation date or a deactivation date greater than the present day.

### **Roaded-Natural (RN)**

- *RN is characterized by a predominantly natural or natural-appearing environment with road access.*
- *There are occasional rustic structures.*
- *There are moderate interactions among other users and evidence of other users.*
- *The type and level of motorized use can vary significantly, and recreation facilities can be more developed than in semi-primitive areas (SPM).*
- *This class differs from SPM in that there are more roads within the class and the main form of access is by roads.*

The Roaded-Natural data class was derived from a 1-kilometre buffer from the centrelines of the following datasets (total width = 2 km):

- Forest tenure roads that had been retired between 2011 and 2016.
- Roads from the Digital Road Atlas that fell into the following classes:
  - Resource
  - Recreation
  - Restricted
  - Skid
  - Trail
  - Unclassified

### **Semi-Primitive Motorized (SPM)**

- *SPM is characterized by a predominantly natural or natural-appearing environment of a moderate to large size.*
- *Structures are rare and isolated.*
- *Interaction among users is low, but there may be evidence of other users.*
- *A low degree of motorized use occurs within the area, generally on trails, rough tracks, or over snow. Recreation facilities are rare and isolated.*

- *The only difference between this class and SPNM is that motorized use is more common in SPM.*

The Semi-Primitive Motorized data class was derived from a 1-kilometre buffer from the centrelines of the following datasets (total width = 2 km):

- Pipelines.
- Transmission lines (electric powerline).
- Recreation lines established under Section 58 Recreation Orders where the use restriction was motorized.
- Snowmobile management trails with no retirement date.
- Oil and Gas Commission (OGC) Geophysical Final Plans (2002-2006); Cutlines from the RSEA disturbance layer (level B), "Miscellaneous Lines 2" with a cut width of 1.75m and greater from a level B RSEA disturbance layer.
- OGC Geophysical Final Plans (1996-2004), OGC Geographical Program Permits layer with width 1.75m and greater, and all cut types except gravity/aeromagnetic, new hand cut, and existing hand cut.

Any resultant areas less than 1000 hectares were amalgamated or removed.

### **Semi-Primitive Non-Motorized (SPNM)**

- *SPNM is characterized by a predominantly natural or natural-appearing environment of a moderate to large size.*
- *Access is generally non-motorized, and structures are rare and isolated.*
- *Interaction among users is low, but there may be evidence of other users (litter, old campfire rings, etc.).*
- *Motorized use within the area generally does not occur, and recreation facilities are very basic (pole tent frame, game rack). This class is closer to roads than the Primitive class.*

Semi-Primitive Non-Motorized data was derived from a 1-kilometre buffer from the centrelines of the following datasets (total width = 2 km):

- Forest tenure roads that have been retired prior to 2011.
- Recreation lines established under Section 58 Recreation Orders where the use restriction was not motorized.
- Recreation trails that had a lifecycle status of active or retired.
- OGC Geographical Program Permits layer with non-motorized cut types (gravity/aeromagnetic, new hand cut, and existing hand cut) and a cut width less than 1.75m. This dataset contains line features for approved and final plan geophysical activity collected on or after October 30, 2006.
- OGC Geophysical Final Plans (2002-2006) with non-motorized geographical cut types (gravity/aeromagnetic, new hand cut, and existing hand cut).

In addition to the 1-kilometre buffer from the aforementioned roads, the SPM, RN, RM, R, and U data classes were buffered by 8 kilometres and added to the 1-kilometre buffer to create the final SPNM data set. Any resultant areas less than 1000 hectares were amalgamated or removed.

### **Primitive (P)**

- *Primitive is characterized by an essentially unmodified natural environment of a fairly large size.*
- *The area is remote, and facilities or development are usually absent.*
- *Interaction among users is very low and evidence of other users is minimal.*
- *The area is essentially free from evidence of humans and there are usually no structures.*
- *Motorized use within the area generally does not occur, except for occasional air access.*

The Primitive class is the area not covered by the previous datasets of SPNM, SPM, RN, RN, R, and U. The polygon sizes also had to be greater than 5000 hectares. Any areas smaller than 5000 hectares were amalgamated with the neighbouring class having the next lower classification.