Dune Environmental Education Program

DUNE RESTORATION LESSON PLAN
[2015]

Designed by Adam Leson
Dune Restoration Team / Resource Conservation
Pacific Rim National Park Reserve
PARKS CANADA AGENCY

D.E.E.P. – DUNE RESTORATION LESSON PLAN

Half-Day Field Trip for Students in High School – Social Studies, Biology, & Science

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GENERAL NOTES & CONSIDERATIONS:

- About: This lesson plan is a concise version of previous D.E.E.P. plans (2009 & 2014). The previous plans have detailed information on most of the topics in this plan (and a great deal of other topics, too…); reference them for more information (if desired). This plan is designed primarily for an inexperienced volunteer, however it is also designed as a modular lesson plan so the volunteer presenting it can remove, supplement, or otherwise modify various aspects of the plan as they choose. Take ownership of your own teaching style!
- Purpose & Objectives: The purpose of this field trip / lesson is for students in social studies (esp. Geography 12) or the sciences (esp. Biology 11) to become engaged with their natural world – and just generally to be interesting and fun for them! This will take two main forms:
    1) An interpretation activity, where studies discover the natural world for themselves and with the aid of instruction from the Parks Canada volunteer; and
    2) An invasive grass-pulling activity, which supports Parks Canada's key strategies of "protecting and restoring cultural resources and ecological integrity" and "enhancing community relations and visitor experience". [Parks Canada, 2010, viii – ix]
- Teaching Philosophy: This plan is focused around the use of task-based-learning, and more specifically student self-directed learning. Questions, and having the students discover information for themselves, are the essential teaching strategies being utilized here. These strategies have been found not only to better engage students, but also improves their retention of the material – it improves their learning.
- Teachers: See *Appendix 1* for curriculum (PLOs) this lesson plan / program meets; once again, it can and even should be adapted to fit other goals the teacher identifies.
- Duration: Lesson should be a half day field trip; approximately 3-5 hours
- Responsibility: Weather-appropriate clothing is the responsibility of each student (and, more generally, their teacher)
    - If weather is bad, move students to an inner dune blowout (beyond the foredune) for wind protection

MATERIALS:

*** Note:** All these resources are found in the sub-folder labeled "Materials", found at:
>> G:\Common\Dune restoration\ERVE\DEEP School Program\2015 Rewrite [Leson, A]\Materials

>> The following need to be checked (and potentially printed) before each Volunteer Field Trip:

- Volunteer Consent Forms and Volunteer Activity Description (includes Photo Release) [x1 per Volunteer]
- Ammophila Removal Tracking Sheet [x1]
- Field Notes Handout [x1 per Plant Identification Sheet]

>> The following should be already made and in the Dune Restoration blue bin / clipboard:

- Volunteer Vests
- Gloves
- Camera
- GPS
- "Tide Guide" Booklets (more available from admin building at PRNPR)
- Plant Identification Sheets (laminated) [x10]
- Mortar Round on Wickaninnish Beach Photograph (laminated)
- Logging Impact [1980] Photograph (laminated)
- Long Beach Before Pacific Rim National Park Photograph [Cars on Beach] (laminated)
- Map of Restoration Zones (laminated)
- Tectonic Plates Image (laminated)
- Park Reclamation of Property [Letter] (laminated)

LESSON PLAN:

**** This plan is a modular approach: its components should be adapted, added to, or removed to fit your guiding & teaching style.*

ORIENTATION: Introductions, Native History, and Eco-Science of the Park

1) Introductions (Name and favourite animal or plant)

2) PRNPR History [Native Story]
   a. Pacific Rim National Park was established in 1970. Comprised of Long Beach, Broken Islands, and West Coast Trial units (by 1972). Officially scheduled as a Park Reserve in 2001. [PRN Park *Reserve* because unsettled First Nations land claims within the park] [PRNPR, 2010, p 2, 6]
   b. *Q: "What do you think this site was, before it was a part of PRNPR?"* [1]
      i. Long Beach Photograph [Cars on Beach] [Shift from *recreation* to *ecotourism* - PRNPR, 2010, p 9]
      ii. Crown land, some cottages, a farm, and…
      iii. First Nations Territories: *"We are within the traditional territory of the Ucluelet and Tla-o-qui-aht First Nations."*
         1. Story – Thunderbird & Skate: *Kaacumin* [A good lesson that parallels the Park's lesson "take only pictures, leave only memories" ethos / leave no trace]: "Thunderbird and Skate decided to play a game on the beach where they tried to spear one another. Thunderbird had the first throw of the spear. When Thunderbird threw, Skate turned sideways and the spear missed him. Skate took his turn and threw the harpoon. Thunderbird created lightning and hail so Skate wouldn't be able to see him. Neither Skate nor Thunderbird were hit, but it is said the hail remained on the beach and turned into pebbles. Future generations are warned never to remove pebbles from this beach because it is said Thunderbird will create fierce hail and lightning." [Atleo, 2014]

3) Dune Restoration Program (conservation and restoration principles)
   a. *"Here at Pacific Rim, we are doing our best to conserve and even restore the Dune environment. To do this, today we are pulling up an invasive species of grass: ammophila, A.K.A. European & American Beachgrass."*
   b. Dune Restoration Zones Map: show progress of dune-site and note green zones (areas restored) and orange ammophila zones (areas still needing restoration).
   c. *Q: "What are invasive species?"* [Species which have been introduced by man; seen as detrimental to the ecosystem; often they have no competition within the new ecosystem]
   d. *Q: "Do you think we need to pull invasive beach-grass?"* [It destroys the dune habitat, which is home to rare plant species – such as the pink sand verbena. // However, we are also "playing God" and killing thousands of living organisms, and it seems futile to do so.][Volunteers should be allowed their own opinions on this topic, and ability to not participate if they vocalise it.]

4) Volunteer Release Form & Volunteer Activity Description Form & Gloves & Vests

[1] Asking this and other questions is intended to elicit prior knowledge from students, as well as simply to engage your audience.

WICKANINNISH BEACH: At Beach; History & Discussion & Interpretation Game

5) Move to Wickaninnish Beach. Then:

a. *"Welcome to Wickaninnish Beach. WHY do you think it's called Wickaninnish Beach?"*

i. Chief Wickaninnish: Probably a line of chiefs (Clayoquot / Tla-o-qui-aht; Nootka) from 1790 till at least 1820. [Sherer Mathes, 1979, p 119]

ii. Story – A Thorn in Wickaninnish's Side: Jonathan Thorn, captain of the Tonquin (American Fur-trading ship), landed near Tofino in Clayoquot Sound. The story goes that he insulted Wickaninnish by rubbing a sealskin he was trading in his face. Chief Wickaninnish swore revenge, and came the next day to "trade", with blankets and furs. On board the Tonquin, Thorn had enough of trying to trade, and ordered the anchor to be taken up, and for the Indian trading party to be "removed" from the ship. Suddenly, the Tla-o-qui-aht attacked, pulling out concealed weapons from under their blankets and animal skins, and killed everyone on board. Or, almost everyone: when they began to plunder the ship, it is believed that a surviving Tonquin crew member held a match to the nine thousand pounds of gunpowder in the ships magazine / hold, "which, in an instant, blew the vessel and everyone on board to atoms" [Sherer Mathes, 1979, p 119] [Lamb, 2015] [Eddins, 2015]

b. WWII Training Grounds & UXOs [see Mason, 2012]:
   i. WWII: Dunes were used in as bombing and training grounds; Long Beach was recognized as particularly vulnerable invasion point – so beaches were covered in mines, pilings, and anti-tank structures were installed at various locations along the beach [DEEP 2009]; afterwards a sweep for unexploded ordinance was done by army in 1975 [Chapman, p 18, 1977]; However, un-exploded ordinance (UXO) was found in 2012, and the dunes were closed for almost 2 years while the DND conducted a comprehensive geographical survey – however, only bits of metal were found [Collyer, pers. obs.].
   ii. Show picture of Mortar Round found in Wickaninnish Dunes in 2012.

6) *Park Interpreter Game*: Organize pairs or small groups for plant identification game
   a. Students compete to identify the most plants during the beach walk
   b. Hand out *Plant Identification Sheets* & *Field Notes Handout* (only 10; extra students can join existing pairs/groups)
   c. Students, in pairs/groups, complete their two Field Notes Handout on two (2) different plants. They then use their phones, cameras, or notepads to identify and interpret as many other plants as they can (it's a competition).

DUNE SITE: Information on Dunes, Beachgrass, and Plants [Beachgrass Pulling]

7) Park Interpreter Game: Evaluation
   a. Give students about 10 minutes at dune site to continue their plant interpretation. Then:
   b. *Q: "Who thinks they've identified the most plants?"*
      i. Group/partners with highest number of plants identified is quizzed.
      ii. They must CORRECTLY identify the plants to the rest of the students (and/or volunteer).
      iii. If they cannot, move to next group/pair of students.
   c. Collect students' Field Notes.
   d. Student pair/group with most correctly identified species wins "team captain" positions in next activity: *Grass Pulling* [see *Step 9*, below].

8) Interpretation of the Natural World
*NOTE: Refer to "*Plant Identification Sheet.doc*" for pictures of plants & grasses.

INTRO: "So now you've identified some of the plants of the dune ecosystem. But what about the dunes themselves? How are the dunes formed?"

   a. [Optional:] Tides & Effect of the Sun & Moon:
      i. *Q: "Are there any surfers here, today?"* [Hand out "TIDE GUIDE" booklet to first 2-5 students to raise their hands][If no surfers, ask for anyone interested in tides].
      ii. Get those students to tell the group when today's high and low tides are, and what their heights are, as well (maximums and minimums).
      iii. PRNPR experiences a semi-diurnal tide, meaning that there are two highs and lows each day, but one is larger than the other.
      iv. Two types of tides: Spring and Neap tides – they alternate every two weeks.
         1. Spring tides – when the earth, moon, and sun are aligned, causing higher than normal tides (tides "spring forth").
         2. Neap tides – when the moon is perpendicular to the alignment of Earth and Sun, causing low tides.

   b. [Optional:] Sand / Sediment Sizes: change as you go up the beach. Higher energy in water and wind moves heavier sand onto foredune, and lower energy wind moves smaller sand into backshore.

   c. [Optional:] Wind – Sea Breeze and Land Breeze:
      i. *Q: "What creates wind?"* [Differences in temperature of air masses]
      ii. Wind will change direction towards the surface that is giving off the most heat
      iii. More heat in day on land, so wind blows from water to land. *Vica versa* at night.
      iv. This wind movement is why we have these lovely dunes in the first place!
         - Invasive Grasses stabilize the sand and stop it from being "blown away" ("Aeolian transport")

d. Dunes:
   i. "Fore-dunes" are most common [grass covered dune ridge behind beaches]
   ii. Most commonly about 2-3m in height
   iii. Active vs. Stabilized: -- Q: "What do you think stabilizes a dune?" [plant life; roots of plants; and logs and driftwood!]

e. Effects of Logging:
   i. Show Logging Impact [1980] picture.
   ii. Logs at back of beaches act as stabilized anchors that allow for colonizing plants to grow – gradually shrinking the dune ecosystem.

f. Grasses:
Q: "When I say go, I want you to use your Plant Identification Sheets to find and bring me an example of invasive grass! …Ready… Go!"
[Participating students should find examples of invasive grasses; discuss similarities and differences together, ensuring students fully understand. Ask if there are any questions.]
   i. INVASIVE: European beach-grass [Ammophila arenaria]
      - Thin blade of grass; round; spikey; yellow-green in color; seed head small and "fluffy"
      - Note: the ligule is visible (translucent and papery) between main stalk and leaves
      - First introduced in Washington & Oregon [Page & Lilley, 2011, p 47], and on Stubbs Island (NW of Tofino) in 1940. [D.E.E.P. 2009, #7]
   ii. INVASIVE: American beach-grass [Ammophila breviligulata]
      - Flat, medium-width blade of grass; yellow-green in color; seed head small and "fluffy"
   iii. NATIVE: Dune grass (dune wild-rye grass) [Leymus mollis]
      - **Wide blade of grass**; dark blue-green in color; seed head large and texturized.
      - Used by some first nations to weave baskets. Saanich used it in tumplines (headstraps used to carry loads on back) the ravels of reef nets [Page & Lilley, 2011, p 44].
   iv. NATIVE: Seashore bluegrass [Poa macrantha]
      - Thin blade of grass; round; somewhat spikey; yellow in color; but SHORT; seed head large and texturized
      - Note: This plant, *poa*, has runner roots that lay often over the sand (or just below)

g. [Optional:] Other Plants:
   i. Pink Sand Verbena [Abronia umbellate]
      - Endangered
   ii. Yellow Sand Verbena [Abronia latifolia]
      - Roots eaten by Clallam and Makah First Nations of the Olympic Peninsula (just south of Van. Island) – may have been used by Coast Salish [Page & Lilley, 2011, p 44].
   iii. Kinnikinnick [Arctostaphylos uva-ursi]
      - Main "stabilizer" plant that grows along sand dunes in vast root networks. Stabilizes dunes.
      - Berries harvested for food; leaves smoked as tobacco [Page & Lilley, 2011, p 45].
      - "Bear berries"; bears often graze upon the berries. [Page, Personal obs.]
   iv. Grey Beach-Peavine [Lathyrus littoralis]
      - Pacific Rim Park is home to over 60% of the total population in Canada. [Parks Canada, 2011]
   v. Coastal (Dune) Strawberry [Fragaria chiloensis]
      - Low abundance food source; cherished for sweetness [Page & Lilley, 2011, p 45].

9) Grass Pulling Activity // Dune Restoration [1 hour]
    a. Winners of Interpretation Game act as "team captains" to select their teams
    b. Students, in teams, compete to pull the most invasive grasses.
    c. *Q: "Who likes math?"* – First student to raise hand (or teacher / interpreter / volunteer) fills out Ammophila Removal Tracking Sheet.
        i. This person stands in center of removal / restoration patch
        ii. GPS or Restoration Zones Map to find grid reference (*northing* and *easting*) of current location.
        iii. Patch radius – measure to edge of patch (radius): *"Imagine a circle around you"* [multiple patch circles can be connected beside one another to fill various polygon shaped patches]
    d. Largest pile wins group photo & fame on *Pacific Rim National Park Reserve* social media (*woooo*.)

WRAP UP: Walk-back to Parking Lot

10) Discussions on:

    a. Park Stewardship

    b. Ethics of Dune Restoration

    c. Darwin – Theory of Evolution – Natural Selection:
        i. *Q: "What is natural selection?"* [The conditions of existence will determine whether or not naturally occurring mutations in animals will allow them to be successful.]
        ii. Darwin did not coin the phrase "survival of the fittest", but it is apt to describe the process.
            - However, it is not necessarily about physical fitness. [Re: Divergence of character leads to a variety's success within a habitat]

    d. Future, Climate Change & Global Warming:
        i. Climate change: 2-3% more precipitation every decade [Walker & Sydneysmith, 2008]; sea level increases 1.7 + 0.8 mm/y [Mazzotti et al, 2008]; and increased storm systems globally.
        ii. Coastal flexure: buildings in Eastern Canada are submerging due to land flex since last ice age [as the glaciers have been removed, the land is expanding again].
        iii. Tectonic Plates Image: As well, the subduction of the Juan de Fuca tectonic plate under Vancouver Island is gradually lifting the island.
            - *Q: "Do you think that we have to worry about global warming, then? Why/why not?"*

    e. Any other topic of interest.

11) Conclusion:
    a. Q: "*What's something interesting you learned today? Something you enjoyed? Didn't enjoy?*"
        i. Use feedback to refine future field trips and your teaching style!

EXTENSIONS:

- Stealing Sticks Game: capture the flag variant; steal 5+ sticks from other team; play in dunes.
- Stewardship Activity: find flotsam / litter
- Orienteering: Use map and compass to find direction back to parking lot, Ucluelet, etc.
    - *Note: for compass, use 18º E declination*
- GPS & Data Instructions: See page 25 of *DEEP 2014* package [Wyatt, 2014]

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APPENDIX 1: CURRICULUM & PLOs

Social Studies: Geography 12
It is expected that students will:
B1 describe the features and processes associated with plate tectonics
C1 describe the features and processes associated with weathering…
C2 describe the features and processes associated with… glaciers, wind, waves…
D5 describe the characteristics of the world's climate regions…
E1 outline characteristics of the Earth's major biomes…
E2 describe how vegetation adapts to environmental conditions
E3 relate soil types to biomes
E4 analyse the interactions between human activity and biomes…
F1 assess the various considerations involved in resource management

Social Studies: Grade 11
It is expected that students will:
• apply critical thinking skills, including: questioning, comparing, summarizing, drawing conclusions…
• demonstrate effective research skills, including… assessing information, collecting data, evaluating data, organizing information, presenting information…
• demonstrate effective written, oral, and graphic communication skills, individually and collaboratively

Social Studies: Grade 10
It is expected that students will:
A1 apply critical thinking skills, including: questioning, comparing, summarizing, drawing conclusions…
A2 demonstrate effective research skills, including… assessing information, collecting data, evaluating data, organizing information, presenting information…
A3 demonstrate effective written, oral, and graphic communication skills, individually and collaboratively
E3 evaluate attitudes and practices in resource development in British Columbia from 1815 to 1914 and their impact on contemporary resource management

Social Studies: Grade 9
Environment
It is expected that students will:
• construct, interpret, and use graphs, tables, grids, scales, legends, contours, and various types of maps
• describe and compare North America's diverse geographical regions
• demonstrate understanding of the ways in which Aboriginal people interact with their environment
• assess the role of geographical factors in the development of trade and settlement in Canada…

Social Studies: Grade 8
Environment
It is expected that students will:
• construct, interpret, and use graphs, tables, grids, scales, legends, and various types of maps
• locate and describe major world landforms, bodies of water, and political boundaries on maps
• locate and describe current and historical events on maps
• describe how physical geography influenced patterns of settlement, trade, and exploration
• analyse how people interacted with and altered their environments…

Science: Geology 12
It is expected that students will:
B6 relate sedimentary features to their depositional environments
D1 relate relative age dating to the development of the Geological Time Scale
E3 relate rock formations and structures to the forces that create them
E4 analyse structures, processes, and evidence that support plate tectonic theory
F1 analyse features and processes associated with weathering and erosion
F4 explain the processes and features associated with glaciation

Science: Biology 12
It is expected that students will:
B2 describe the characteristics of water and its role in biological systems

Science: Biology 11
It is expected that students will:
B1 apply the Kingdom system of classification to study the diversity of organisms
D1 analyse the functional inter-relationships of organisms within an ecosystem
F1 analyse how the increasing complexity of algae, mosses, and ferns represent an evolutionary continuum of adaptation to a land environment
F2 analyse how the increasing complexity of gymnosperms and angiosperms contribute to survival in a land environment
G1 analyse how the increasing complexity of animal phyla represents an evolutionary continuum

Science: Earth Science 11
It is expected that students will:
E1 explain the significance of seismology
E3 outline the development of plate tectonic theory
F2 describe the function of the hydrologic cycle
F3 relate the processes associated with weathering and erosion to the resulting features
F4 describe features and processes associated with physical oceanography

Science: Science & Technology 11
It is expected that students will:
A3 evaluate different methods, including those from Aboriginal cultures, of food production, processing, and preservation
E3 discuss the impact of society on natural resource management and the environment

Science: Grade 10
It is expected that students will:
A5 demonstrate ethical, responsible, cooperative behaviour
B1 explain the interaction of abiotic and biotic factors within an ecosystem
B2 assess the potential impacts of bioaccumulation
B3 explain various ways in which natural populations are altered or kept in equilibrium
D3 evaluate possible causes of climate change and its impact on natural systems
D4 analyse the processes and features associated with plate tectonics
D5 demonstrate knowledge of evidence that supports plate tectonic theory

Science: Grade 8
It is expected that students will:
A6 demonstrate ethical, responsible, cooperative behaviour
B1 demonstrate knowledge of the characteristics of living things
C5 explain the concept of force
C6 describe the relationship between solids, liquids, and gases, using the kinetic molecular theory
C8 explain the relationship between pressure, temperature, area, and force in fluids
C9 recognize similarities between natural and constructed fluid systems (e.g., hydraulic, pneumatic)
D1 explain the significance of salinity and temperature in the world's oceans
D2 describe how water and ice shape the landscape
D3 describe factors that affect productivity and species distribution in aquatic environments

Science: Grade 7
It is expected that students will:
• Analyze the roles of organisms as part of interconnected food webs, populations, communities, and ecosystems
• Assess survival needs and interactions between organisms and the environment
• Assess the requirements for sustaining healthy ecosystems
• Evaluate human impacts on local ecosystems
• Analyse the dynamics of tectonic plate movement and landmass formation
• Explain how the Earth's surface changes over time

APPENDIX 2: INDIVIDUAL VOLUNTEER FORM

Parks Canada Parcs Canada

Individual Volunteer Form

Project Title: Dune Restoration & Invasive Plant Management

I _____, residing at _____ in the city of _____, in the province/territory of _____, postal code _____, hereinafter called the "volunteer", do hereby endeavour to, with Her Majesty the Queen in Right of Canada, as represented by the Minister responsible for the Parks Canada Agency ("Parks Canada"), undertake the above volunteer activity, on a voluntary basis, as more specifically described in the ***Volunteer Activity Description Form*** dated April 16 2015 , attached to and forming part of this form, to the satisfaction of the Minister's officers in Parks Canada.

1. No employer-employee relationship between Her Majesty and the volunteer is created, contemplated or implied by this form.

2. The volunteer may be reimbursed for out of pocket expenses for up to a maximum of N/A under this form as set-out in the Volunteer Activity Description Form attached

3. Material, equipment or services to be provided by Her Majesty for the Volunteer's use under this form are described on the Volunteer Activity Description Form. Materials or equipment may be provided in the following four categories, as applicable to the volunteer activity:
   a. Use of materials that do not constitute a loan (for example: projector in a theatre);
   b. Informal loan (for example: binoculars or bicycle);
   c. Formal loan (material valued over $1000 or borrowed for a longer period);
   d. Permission to drive or ride in a government vehicle.

4. If appropriate, the volunteer will endeavour to submit a detailed report on the volunteer activity to Parks Canada:
   a. On completion of the volunteer activity, at the option of the volunteer; or
   b. Within two (2) weeks after a written request by the accountable manager for such a report.

5. The volunteer will endeavour to complete the work set-out on the Volunteer Activity Description Form.

6. Parks Canada provides a Group Personal Accident policy* for volunteers who sign this form, covering most volunteer activities. Parks Canada provides volunteers, excluding those who operate aircraft, with $10,000,000 coverage for third-party (public) liability. Parks Canada will inform the volunteer what additional insurance coverage, if any, he/she should carry during the volunteer activity.

7. Please provide the name and telephone number of an emergency contact:

_____

_____

8. Please provide an e-mail and/or phone number for ease of contact

_____

Canada

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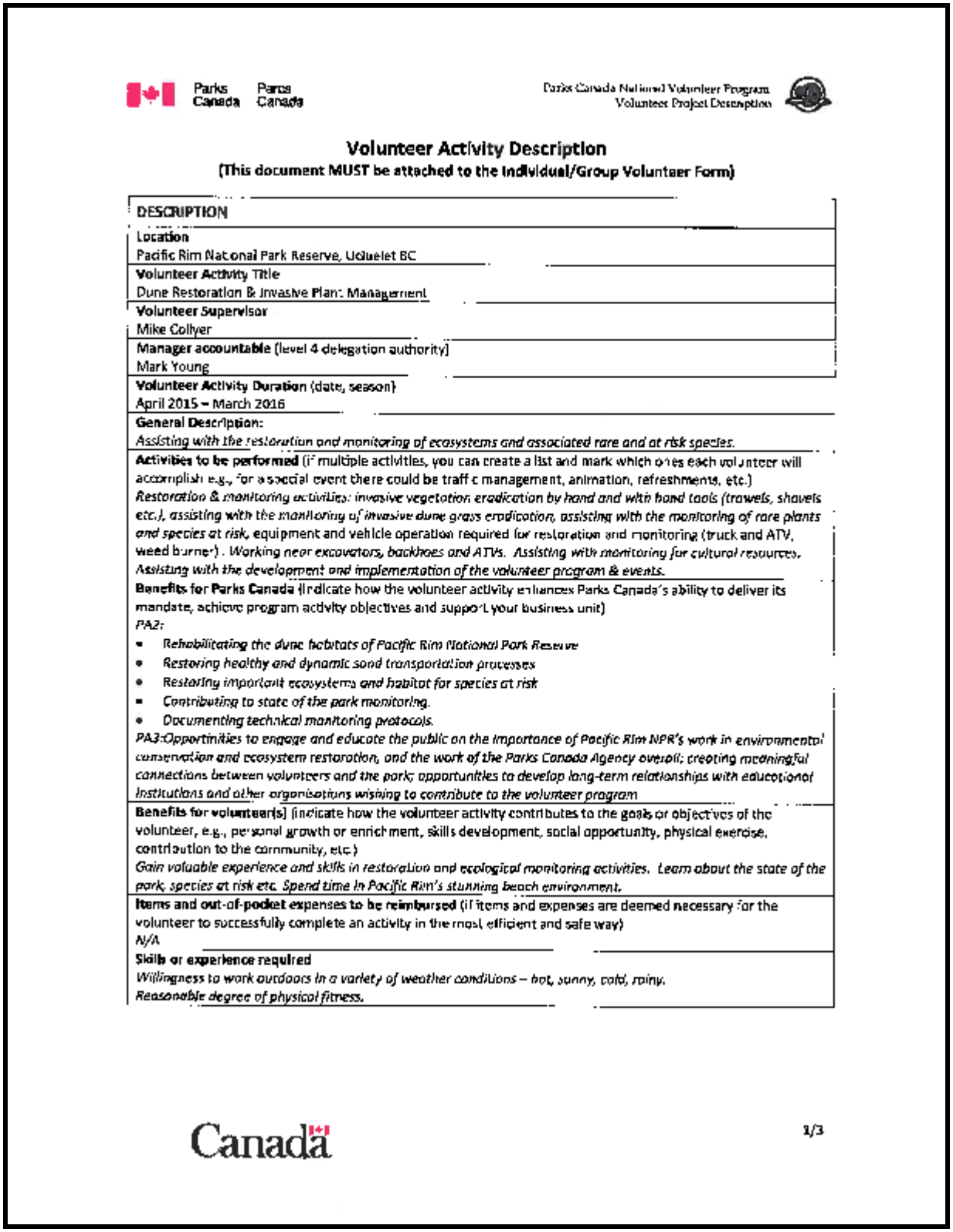
APPENDIX 3: VOLUNTEER ACTIVITY DESCRIPTION



Parks Canada | Parcs Canada

Parks Canada National Volunteer Program
Volunteer Project Description

Volunteer Activity Description

(This document MUST be attached to the Individual/Group Volunteer Form)

DESCRIPTION

Location
Pacific Rim National Park Reserve, Ucluelet BC

Volunteer Activity Title
Dune Restoration & Invasive Plant Management

Volunteer Supervisor
Mike Collyer

Manager accountable (level 4 delegation authority)
Mark Young

Volunteer Activity Duration (date, season)
April 2015 – March 2016

General Description:
Assisting with the restoration and monitoring of ecosystems and associated rare and at risk species.

Activities to be performed (if multiple activities, you can create a list and mark which ones each volunteer will accomplish e.g., for a special event there could be traffic management, animation, refreshments, etc.)
Restoration & monitoring activities: invasive vegetation eradication by hand and with hand tools (trowels, shovels etc.), assisting with the monitoring of invasive dune grass eradication, assisting with the monitoring of rare plants and species at risk, equipment and vehicle operation required for restoration and monitoring (truck and ATV, weed burner). *Working near excavators, backhoes and ATVs. Assisting with monitoring for cultural resources. Assisting with the development and implementation of the volunteer program & events.*

Benefits for Parks Canada (indicate how the volunteer activity enhances Parks Canada's ability to deliver its mandate, achieve program activity objectives and support your business unit)
PA2:

- *Rehabilitating the dune habitats of Pacific Rim National Park Reserve*
- *Restoring healthy and dynamic sand transportation processes*
- *Restoring important ecosystems and habitat for species at risk*
- *Contributing to state of the park monitoring.*
- *Documenting technical monitoring protocols.*

PA3:Opportunities to engage and educate the public on the importance of Pacific Rim NPR's work in environmental conservation and ecosystem restoration, and the work of the Parks Canada Agency overall; creating meaningful connections between volunteers and the park; opportunities to develop long-term relationships with educational institutions and other organizations wishing to contribute to the volunteer program

Benefits for volunteer(s) (indicate how the volunteer activity contributes to the goals or objectives of the volunteer, e.g., personal growth or enrichment, skills development, social opportunity, physical exercise, contribution to the community, etc.)
Gain valuable experience and skills in restoration and ecological monitoring activities. Learn about the state of the park, species at risk etc. Spend time in Pacific Rim's stunning beach environment.

Items and out-of-pocket expenses to be reimbursed (if items and expenses are deemed necessary for the volunteer to successfully complete an activity in the most efficient and safe way)
N/A

Skills or experience required
Willingness to work outdoors in a variety of weather conditions – hot, sunny, cold, rainy.
Reasonable degree of physical fitness.

Canada

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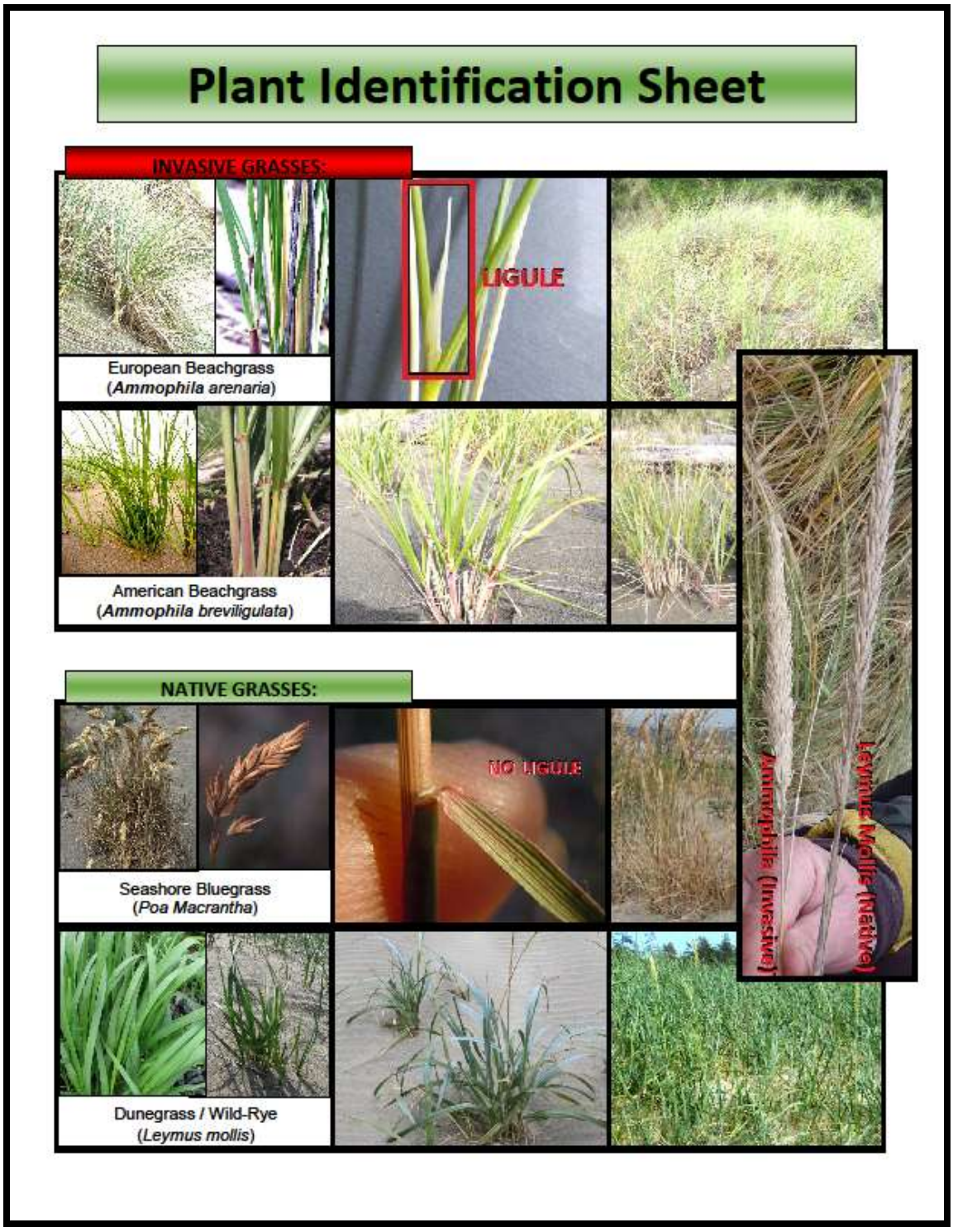
APPENDIX 4: PLANT IDENTIFICATION SHEET



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APPENDIX 5: FIELD NOTES FORM

FIELD NOTES

Name:_____

Pant I.D.: *(name of suspected species; common/latin)*				
Plant: Height, Color, Stalk Texture: *(smooth, rigid, hairy, thorny, creeping)*				
Leaf: Shape, Size, Color, Texture: *(circular, heart-shaped, quarter-sized)*				
Flowers, Seeds & Fruit: Size, Texture (angiosperm/fruit/flower vs. gymnosperm/cone/naked seed)				
Habitat & Conditions: (sand, back dune, fore dune, parasitic, etc) (wet, shady, dry, sunny, etc)				
Proliferation / Colony / No. of Species & Brief Description:				
Other Notes: (anything interesting or otherwise of note?)				

FIELD NOTES

Name:_____

Pant I.D.: *(name of suspected species; common/latin)*				
Plant: Height, Color, Stalk Texture: *(smooth, rigid, hairy, thorny, creeping)*				
Leaf: Shape, Size, Color, Texture: *(circular, heart-shaped, quarter-sized)*				
Flowers, Seeds & Fruit: Size, Texture (angiosperm/fruit/flower vs. gymnosperm/cone/naked seed)				
Habitat & Conditions: (sand, back dune, fore dune, parasitic, etc) (wet, shady, dry, sunny, etc)				
Proliferation / Colony / No. of Species & Brief Description:				
Other Notes: (anything interesting or otherwise of note?)				

APPENDIX 6: AMMOPHILA REMOVAL TRACKING SHEET (V2)

Ammophila Removal Tracking Sheet

Date:	**Team Members:**
Search Start Time:	
Search End Time:	

Restoration Zone (see map)	Regrowth (y/n)	GPS Easting	GPS Northing	Patch Radius	Pile size estimate (m3)	People Hours	Notes

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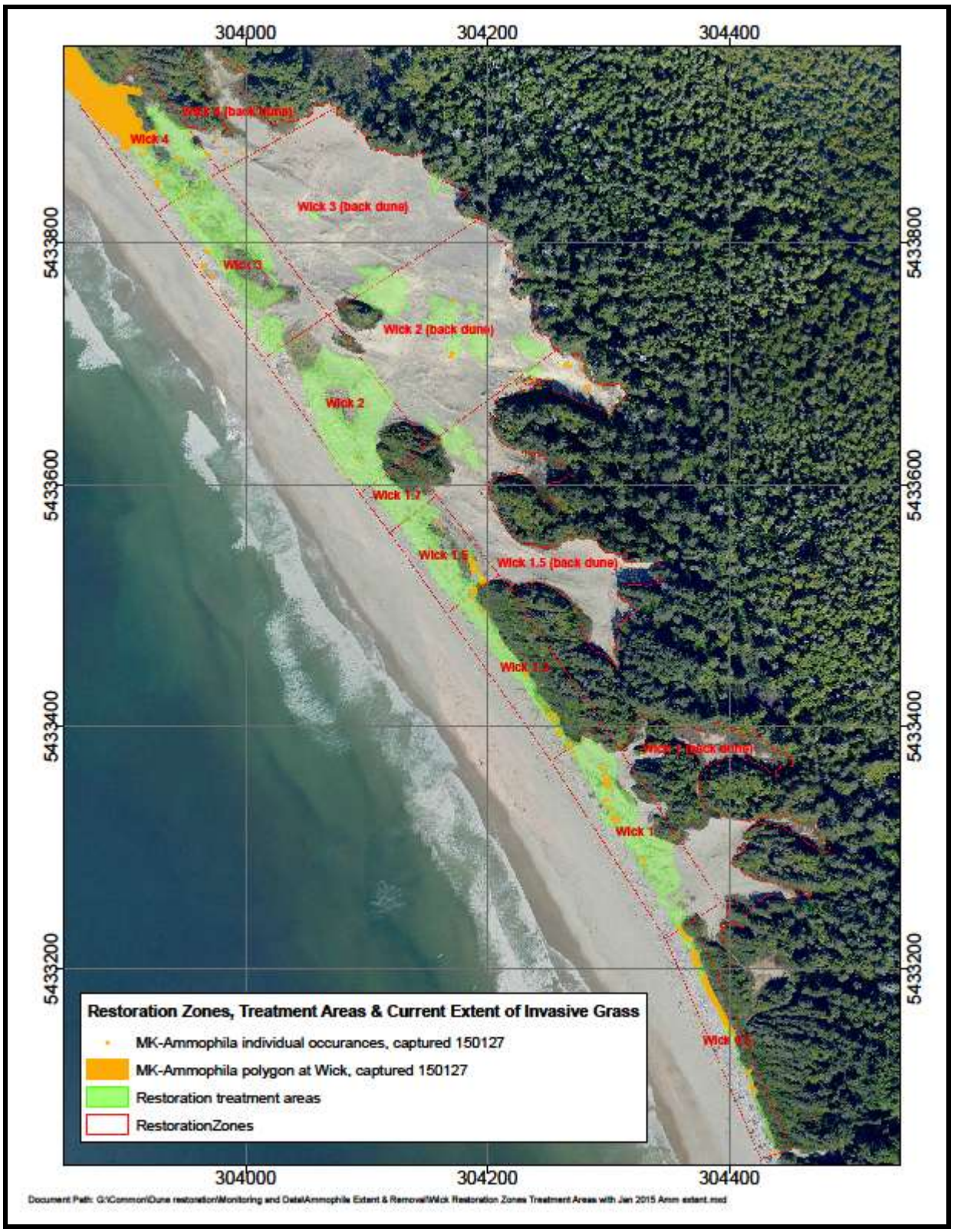
APPENDIX 7: RESTORATION ZONES MAP



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APPENDIX 8: LOGGING IMPACT (1980) IMAGE

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APPENDIX 9: MORTAR ROUND ON WICKANINNISH BEACH PHOTOGRAPH

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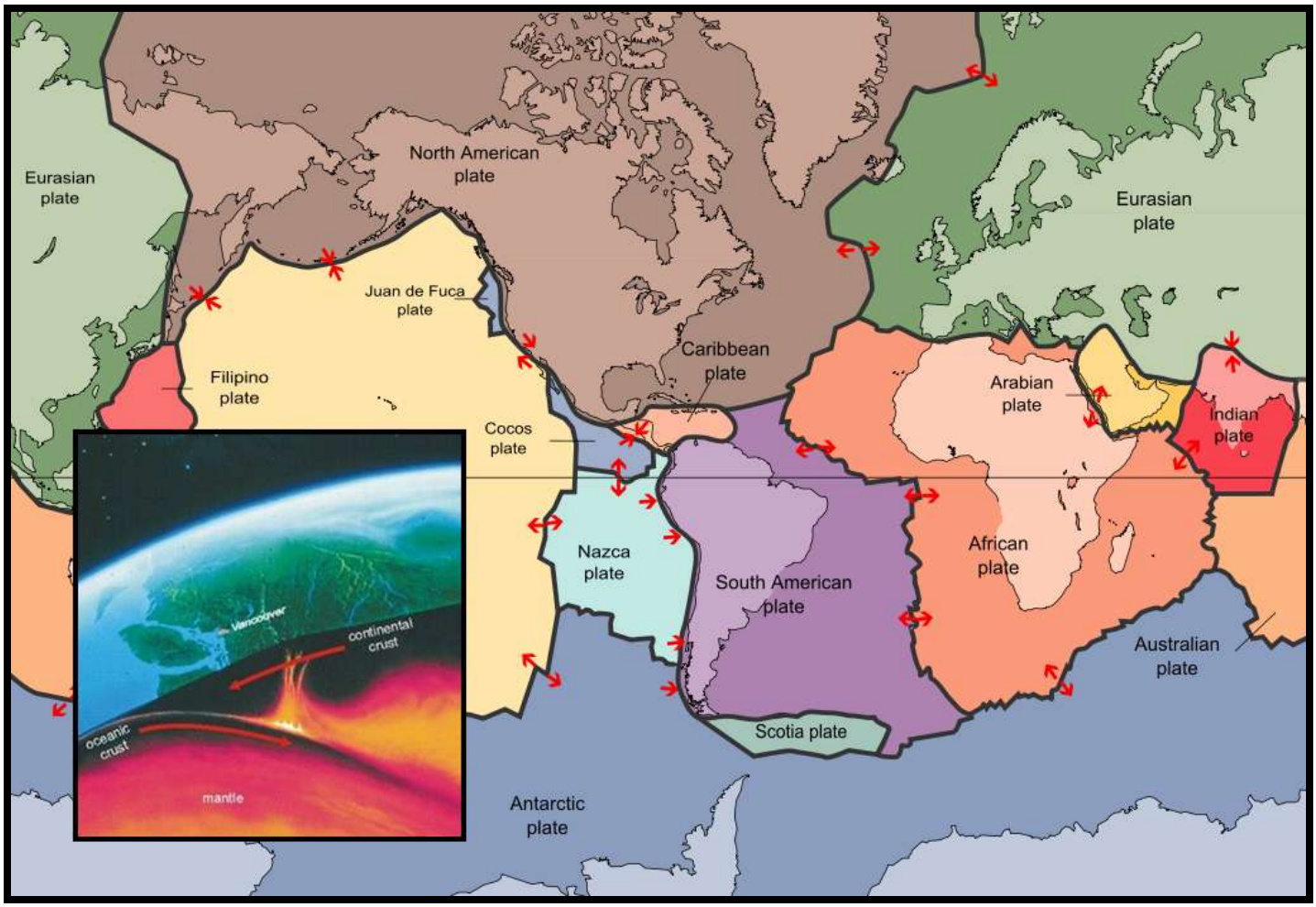
APPENDIX 10: TECTONIC PLATES IMAGE



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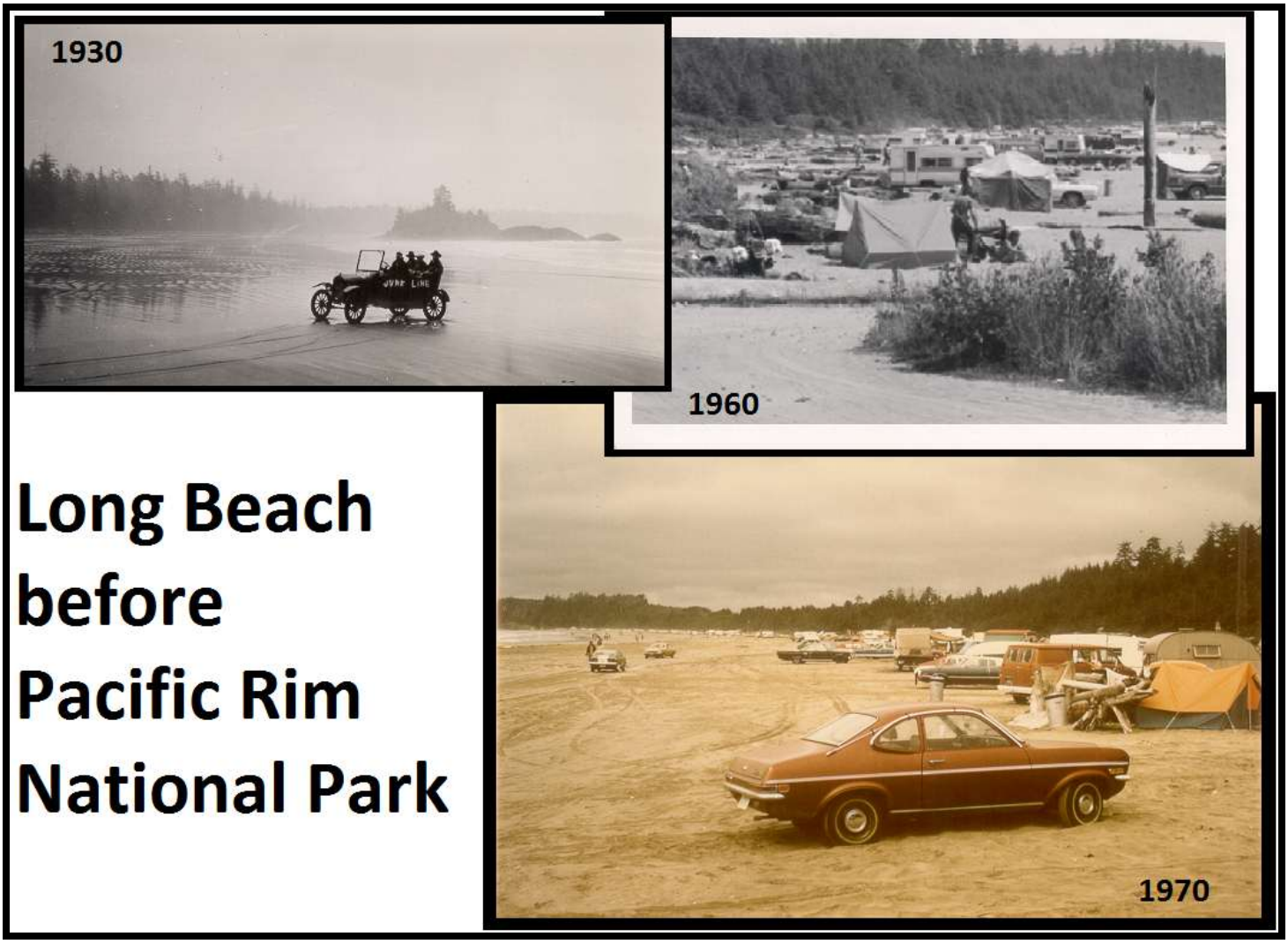
APPENDIX 11: LONG BEACH BEFORE PACIFIC RIM PARK PHOTOS



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APPENDIX 12: PARK RECLAIMATION OF PROPERTY [LETTER]

THIS HOUSE

This house has been forgotten, it stands among decay,
A Silver castle this home of old, and sunshine finds its way
through a cracked and dirty window, shines on a broken stair,
casting shadows in the dusty halls, on a carpet worn and bare.

This house was once proud and happy, the walls with joy did ring,
While dark-eyed girls and gallant men, the old songs did sing,
there's the sound of smothered laughter, footsteps on the stair
and she appears most gracious, with her crown of golden hair.

The house where once was heard, organ music low and sweet,
Voices soft in the candlelight, the sound of dancing feet,
there's the gentle voice of women, the way of courteous mem,
as through the night they linger, turn to say goodnight again.

With a hand that lingers on the door, I turn with misty gaze
And say farewell to this old house, a home of bygone days,
and soon it will be a memory, my heart is sad to know
It's just a place to be removed, to make room for a park to grow.

Norma Heyd
1972.

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