

Outdoor Heritage Fund Grant Application



Project Name: Enhancing State Parks Through Strategic Tree and Shrub Plantings

Name of Organization: North Dakota Parks and Recreation Department

Federal Tax ID#: 45-0433249

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List names of co-applicants if this is a joint proposal: N/A

MAJOR Directive:

Choose only one response

Directive A. Providing access to private and public lands for sportsmen, including projects that create fish and wildlife habitat and provide access for sportsmen.

Directive B. Improving, maintaining, and restoring water quality, soil conditions, plant diversity, animal systems and by supporting other practices of stewardship to enhance farming and ranching.

Directive C. Developing, enhancing, conserving, and restoring wildlife and fish habitat on private and public lands; and

Directive D. Conserving natural areas and creating other areas for recreation through the establishment and development of parks and other recreation areas.

Additional Directive:

Choose all that apply

Directive A.

Directive B.

Directive C.

Directive D.

Type of organization:

State Agency

Political Subdivision

Tribal Entity

Tax-exempt, nonprofit corporation.

Abstract/Executive Summary (500 words)

This grant request aims to conduct North Dakota Parks and Recreation's most extensive statewide tree planting initiative to date. The requested funding will allow the department to execute a strategic and concerted tree and shrub planting program which will cover every North Dakota State Park.

Under Chapter 55-08 of the North Dakota Century Code, the parks and recreation department “shall plan and coordinate government programs encouraging the full development and preservation of existing and future parks, outdoor recreation areas and nature preserves.” Over the past four years, North Dakota State Parks have seen record visitation, with annual numbers exceeding 1.2 million visitors and 95,000 overnight stays which equates to nearly 315,000 overnight guests by visitors coming from as far away as Mexico, Canada, and Europe. Our state parks offer a diverse array of outdoor recreation opportunities to both citizens and tourists, spanning from day use recreation and education to extended camping experiences, all within publicly accessible lands.

As the utilization of our state parks continues to rise, there is a growing need to prioritize conservation and specifically focus on our natural resources. Trees are integral to the visitor experience. They provide shade, shelter, delineation of spaces, habitat, erosion control and an aural and visual aesthetic. Many of the trees in our parks, however, are aging out, victims of pests or disease, or simply not at optimal locations. Our initial focus will be to obtain and plant larger containerized trees in high-priority (Tier I) areas where they can quickly establish and have a positive impact on the visitor experience.

This grant application seeks to address this need by strategically planting and mapping containerized stock of shade trees and large shrubs. These plantings are intended to establish quickly and provide enduring benefits to citizens and tourists for decades to

come. Through this request of \$1,410,335 we aim to enhance the ecological health and recreational value of North Dakota's state parks by executing a project with a total cost of over \$1,750,000 that will enhance our parks' tree inventory to help foster a sustainable environment for present and future generations to enjoy.

Project Duration: 2024 - 2027

Schedule for drawing down OHF funds: November 30, 2024,
 June 15, 2025,
 November 30, 2025,
 June 15, 2026,
 November 30, 2026,
 June 15, 2027

Amount of Grant Request: \$ 1,410,335
Amount of Matching Funds: \$ 352,565
Total Project Costs: \$ 1,762,900

Table 1 Matching Funds

Amount of Match	Funding Source	Type of Match (Cash, In-kind or Indirect)
\$177,190	State Special Funds	Cash
\$150,375	State Special Funds	In-Kind, Labor
\$25,000	Federal	Cash

Certifications

X I certify that this application has been made with the support of the governing body and chief executive of my organization.

X I certify that if awarded grant funding, none of the funding will be used for any of the exemptions noted in the back of this application.

Narrative

History: In 1921, North Dakota began the process of establishing state parks. By 1963, North Dakota had six parks, seven recreation areas, and fifty-three state historical monuments. In 1965, a North Dakota Park Service was established. In 1977 the Park Service was changed to North Dakota Parks and Recreation Department. Today there are 14 parks, 28 natural and recreational areas totaling over 20,000 owned and leased acres.

Mission Statement: Enrich generations through experiences that connect people and places.

Organization: ND Parks and Recreation is comprised of the following major divisions: Business Services, Human Resources, Communications, Education and Programs, Planning and Projects, Natural Resources, Field Operations (East & West), Outreach and Engagement and Recreation.

Natural Resources Division: The Natural Resources Division administers natural resource management programs including habitat enhancement projects through noxious weed control, tree and shrub planting, woodland management, prairie enhancement and restorations, streambank stabilization, and conservation education.

Natural Resources Division staff include one full-time Natural Resources Division Chief, one long-term temporary natural resource specialist, and four seasonal natural resource technicians. The natural resource team works closely with Planning and Projects, Outreach and Engagement, and Field Operations Division teams.

Collaboration across various sectors is crucial for achieving the goals and objectives of the Natural Resources Division. Partnering with state, federal, and private organizations enhances the effectiveness of initiatives such as prairie restoration and prescribed fire burns, tree and shrub planting, tree risk assessment and mitigation, forest health, and conservation education. Each partner brings unique expertise, resources, and perspectives, enabling a more comprehensive and sustainable approach to natural resource management and conservation. By working together, these organizations can leverage their strengths and address challenges more efficiently, benefiting the environment and enhancing visitor experiences.

Purpose of Grant

Goal: The goal is to create and maintain healthy, diverse ecosystems anchored by appropriate native tree and shrub plantings within state parks that support wildlife, provide recreational opportunities, contribute to broader conservation efforts, and enhance the visitor experience. North Dakota Parks and Recreation intends to undertake its most extensive statewide tree planting initiative to date. The requested funding will allow the

department to execute a strategic and concerted tree and shrub planting program in Tier I A visitor centric areas in every North Dakota State Park.

Strategy: To assess, categorize, develop landscape planting templates, install, evaluate, and manage comprehensive tree and shrub plantings in high-priority state park landscapes starting with Tier I A priority areas.

Background - Strategic Planning: In late 2023, the North Dakota Parks & Recreation Department (NDPRD) identified the need to scope out the potential magnitude of a state-wide, concerted program to increase tree and large shrub plantings at state parks. With the department's mission being to "Enrich generations through experiences that connect people and places", increasing attention is being placed on the visitor experience, from provision of shade to enhancement of wildlife viewing through habitat enhancements. Thoughtful plantings of trees and large shrubs provide many of these enhancements.

Planting efforts to date have been of relatively small volume with small stock and primarily aimed at replacing or supplementing existing trees. Landscape architects from the firm Short Elliott Hendrickson, Inc (SEH) were retained to bring third party eyes to a set of representative parks to develop typical model planting design templates, assist in establishing priorities and in preparing cost estimates.

Areas were calculated and the degree of existing tree cover applicable to the ideal templates estimated, generating tree numbers and sizes required. Applied against cost factors for supply, contracted planting and related costs, costs generated for each of the representative parks for a long term, complete program. Per acre averages of these planting program costs were then applied to the remaining parks in the NDPRD system and divided into manageable 3-year program increments for a statewide planting program.

Once funding is approved, detailed planting plans can be generated for both contracting purposes and future in-house installations. Plans that can reflect specific nuances of regional stock availability at the time of installation, contracting strategy, most recent tree removals, other infrastructure initiatives and plant grouping for efficient maintenance resource allocation

Comprehensive Tree Planting Strategy

Landscape architects from the firm Short Elliott Hendrickson, Inc initiated the first steps of NDPRD's Comprehensive Tree Planting Strategy, including inventory maps, land-use category maps, and a landscape matrix database.

In person site review, discussions with NDPRD staff and aerial imagery review and analysis allowed for use area types to be identified and classified into four priority tiers. Tier I and Tier II areas were identified as the areas having most impact on the visitor experience and the priority for first phases of a planting program.

The site inventory map highlights existing infrastructure and larger plantings. The purpose of the map is to document areas of use and planned use areas. Areas on the maps include Cabin sites, campgrounds, cultural areas, hay lands, maintenance areas, native grasslands, RV and boat storage, sewer lagoon/pond, shelterbelts, shops, and tree rows.

From the site inventory map a site category map was created which is a visual representation of the Landscape matrix. (Refer to Figure 1 Grahams Island State Park Category Map.)

- Built Environment (entrance, visitor and activity centers, cabins, amphitheaters)
- Campground (dense, dispersed, and primitive camping sites)
- Corridors (roadways and trails)
- Cultural Resources (Native American cultural and sacred places)
- Facilities (maintenance buildings and areas, storage areas)
- Historical Resources (structures, elements and interpretive)
- Open Space (wooded areas unprogrammed, cultivated, programmed i.e., playgrounds)
- Shorelines (boat launches, beaches, and fishing area)

Each subcategory e.g., Dispersed campgrounds, cabins, trails was then assigned a tier level from I-IV with I being highest priority for tree plantings. Tiers levels categorized planting site priorities to allow for strategic planning, resource allocation, and decision-making in tree and shrub planting initiatives within state park landscapes. Refer to Table for an example of a landscape matrix database for Grahams Island State Park.

- Tier I A areas include visitor centric areas such as campgrounds, visitor centers, activity centers, concessions, and marina approaches.
- Tier I B areas include additional plantings in visitor centric areas such as campgrounds, visitor centers, activity centers, concessions, and marina approaches.
- Tier II areas include visitor facing facilities such as entry roadways, trails, and primitive camp sites.
- Tier III areas include maintenance areas requiring shade or screening, areas that have experienced significant removals, programmed open spaces and waterfront activity areas such as beaches, fishing areas, boat launches and areas anticipated for future development where early, planned tree planting could enhance the finished product.
- Tier IV areas include unprogrammed open space, shelterbelts, existing tree stands, treatment lagoon areas and areas which may have a high likelihood of sensitive cultural sites and artifacts or paleontological features.

Aerial photo interpretation was used for approximating dimensions of all sub-categories. Based on dimensions and acres, tree counts were estimated for each tree type such as canopy trees, understory and small trees, conifers, and shrubs. Values in the landscape

database matrix can then be manipulated based on years, funds available or percentage of tree count goal to meet. A summary of all parks with estimated park use areas identified for proposed planting has also been generated. This table provides projected tree planting costs within 5 years and projected 5+ years.

Individual Park planting cost estimates are easily extrapolated from the Landscape Matrix database. For this project we are looking at three-year plant cost estimates in Tier I A Priority areas (campgrounds, visitor centers, activity centers, concessions, and marina approach areas). Refer to Table 4 for an example of Grahams Island State Park planting estimate: Tier I A priority. Landscape Matrix data can also be manipulated to select multiple Tier priority areas.

The landscape matrix database will guide allocation of resources for future tree and shrub planting efforts within state parks, facilitate strategic decision-making, maximize tree planting program outcomes, and promote sustainable management practices. In addition to the database, landscape template infographics includes category planting goals, suggested canopy, understory and conifer trees and shrubs, and a visual representation of ideal planting layouts.

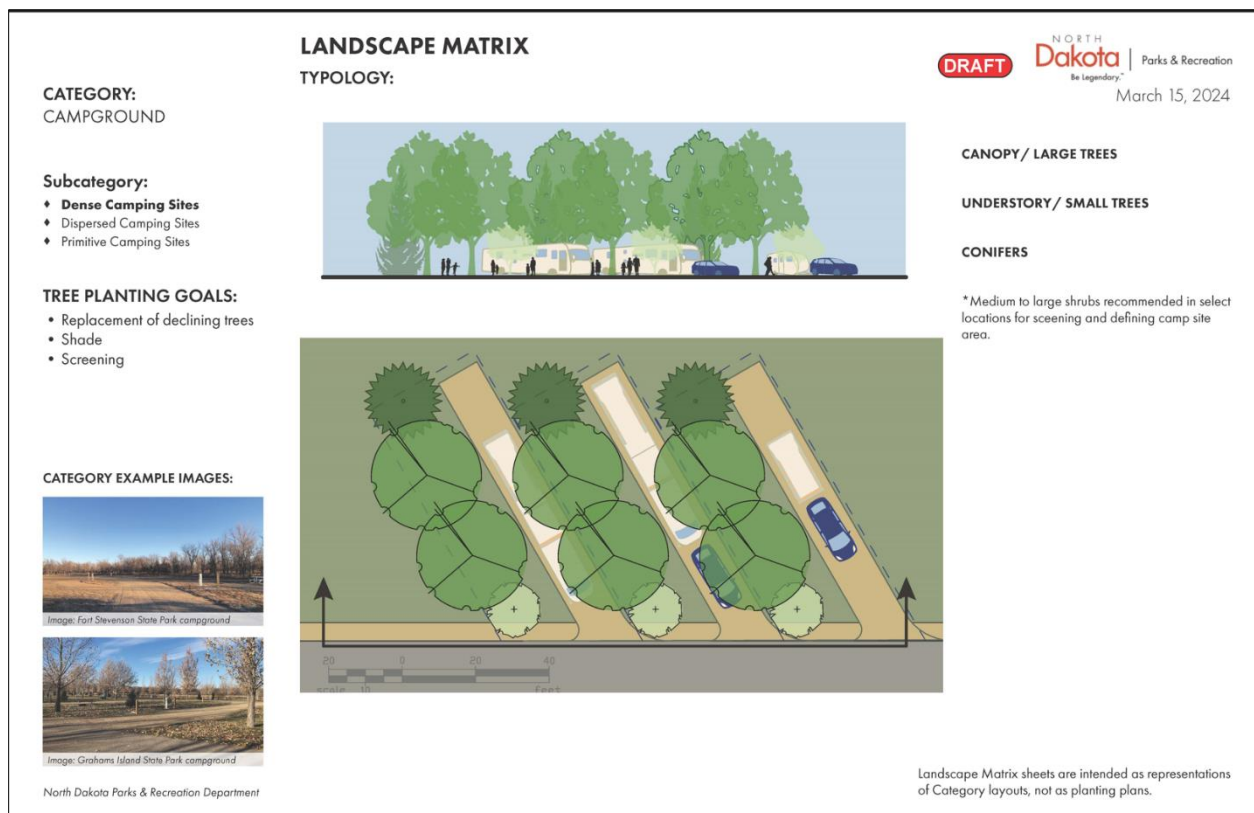


Figure 1 Example of a Landscape Matrix for Category Campground

Table 2 Tree Planting Costs Projections Summary

PARK NAME	ESTIMATED TARGET PLANTING ACRES	ESTIMATED TOTAL TREE COUNT ALL TIER 1 SITES	ESTIMATED PLANTING COST FOR TIER 1 SITES	PLANTING COST ESTIMATE TIER 1 PER ACRE	ESTIMATED ITEM COUNT FOR TIER 1 WITHIN 3 YRS	PROJECTED PLANTING COST TIER 1 WITHIN 3 YEARS
BEAVER LAKE STATE PARK	283	163	\$ 90,125.00	\$ 318.46	131	\$ 73,060
CROSS RANCH STATE PARK	420	185	\$ 101,425.00	\$ 241.49	160	\$ 87,371
FORT ABRAHAM LINCOLN STATE PARK	600	261	\$ 146,280.00	\$ 243.80	224	\$ 125,678
FORT RANSOM STATE PARK	385	170	\$ 95,385.00	\$ 247.75	138	\$ 77,454
ICELANDIC STATE PARK	403	175	\$ 97,890.00	\$ 242.90	150	\$ 84,046
LAKE METIGOSHE STATE PARK	350	160	\$ 88,520.00	\$ 252.91	120	\$ 67,390
LEWIS & CLARK STATE PARK	410	608	\$ 327,460.00	\$ 798.68	366	\$ 202,688
LITTLE MISSOURI STATE PARK	20	40	\$ 22,530.00	\$ 1,126.50	31	\$ 17,335
SULLY CREEK STATE PARK	63	85	\$ 49,830.00	\$ 790.95	65	\$ 38,196
TURTLE RIVER STATE PARK	586	411	\$ 238,570.00	\$ 407.12	206	\$ 98,675
FORT STEVENSON STATE PARK	586	1743	\$ 982,715.00	\$ 1,676.99	586	\$ 455,038
GRAHAMS ISLAND STATE PARK	575	400	\$ 233,360.00	\$ 405.84	139	\$ 88,001
LAKE SAKAKAWEA STATE PARK	500	1614	\$ 904,220.00	\$ 1,808.44	439	\$ 347,969
TOTALS	5181	6015	\$ 3,378,310.00		2755	\$ 1,762,900

Table 3 Itemized Plant Materials and Supplies by Park

ITEM	GISP	FSSP	LSSP	TRSP	SCSP	LMOSP	LCSP	LMSP	ISP	FRSP	FALSP	CRSP	BLSP	Totals
PLANTS														
CANOPY TREES	105	452	327	150	38	15	204	60	75	68	124	79	65	1762
UNDERSTORY TREES	10	10	10	21	15	12	82	24	30	28	51	32	26	468.2
CONIFER TREES	17	17	17	25	12	4	6	18	24	22	9	9	21	292
SHRUBS	7	107	85	10	0	0	74	18	21	20	40	40	19	441
Sub Totals	139	586	439	206	65	31	366	120	150	138	224	160	131	2755
PLANT ACCESSORIES														
TUBES/ STAKES	74	400	292	74	38	15	174	53	68	64	111	68	56	1487
FENCING (DEER PROTECTION)	50	305	220	49	23	8	90	38	51	48	60	60	40	1022
MATERIALS														
MULCH (CY)	48	301	49	50	22	10	126	42	51	48	77	77	45	1095

Table 4 Example of Individual Park Tree Planting Cost Estimates

TIER I TOTAL COST - GRAHAMS ISLAND STATE PARK					PLANTING COST ESTIMATE: TIER I PRIORITY Within 3 Years		
ITEM	ESTIMATED TOTAL ITEM COUNT ALL TIER 1 SITES	UNIT	UNIT COST	ESTIMATED PLANTING COST FOR TIER 1 SITES	PROJECTED PLANTING PERCENTAGE WITHIN 3 YRS	ESTIMATED ITEM COUNT FOR TIER 1 WITHIN 3 YRS	PROJECTED PLANTING COST TIER 1 WITHIN 3 YEARS
PLANTS							
CANOPY TREES	300	EACH	\$225	\$67,500	35%	105	\$23,625
UNDERSTORY TREES	30	EACH	\$170	\$5,100	35%	10	\$1,700
CONIFER TREES	50	EACH	\$240	\$12,000	35%	17	\$4,080
SHRUBS	20	EACH	\$80	\$1,600	35%	7	\$560
PLANT ACCESSORIES							
TUBES/ STAKES	210	TREE	\$60	\$12,600	35%	74	\$4,410
FENCING (DEER PROTECTION)	140	TREE	\$100	\$14,000	35%	49	\$4,900
MATERIALS							
MULCH	138	CUBIC YARD	\$120	\$16,560	35%	49	\$5,796
CONTRACTOR SERVICES							
PLANT, TRANSPORT & INSTALLATION	1	LUMP SUM	\$94,000	\$94,000	35%	3	\$32,900
MAINTENANCE							
3-YEAR PLANT ESTABLISHMENT	3	YEAR	\$10,000	\$30,000	100%	3	\$30,000
TOTALS	400			\$253,360		139	\$107,971

Tree Stock Size

Containerized nursery stock refers to plants that are grown and sold in containers rather than being directly planted in the ground. These containers can vary in size and material, ranging from small pots to larger containers such as nursery cans or fabric grow bags. Cost estimates are based #10 (10 gallons) and #20 container (20 gallons). Both #10 and #20 containers are popular choices for nurseries and garden centers because they provide adequate space for plants to grow and develop healthy root systems.

A tree in a #20 container could range from a few feet tall for younger or smaller species to several feet tall for larger or more mature trees. It's not uncommon to find trees in #20 containers that are 6 feet or taller. In addition to height, the caliper of the tree's trunk is also an important consideration. Trees in #20 containers may have trunk diameters ranging from a few inches to several inches, depending on the species and age of the tree.

Containerized nursery stock offers several advantages over traditional bare-root plants. They typically have well-established root systems, which can lead to faster establishment and growth after transplanting. Additionally, containerized plants are easier to handle and transport, making them popular choices for both home gardeners and commercial landscapers.

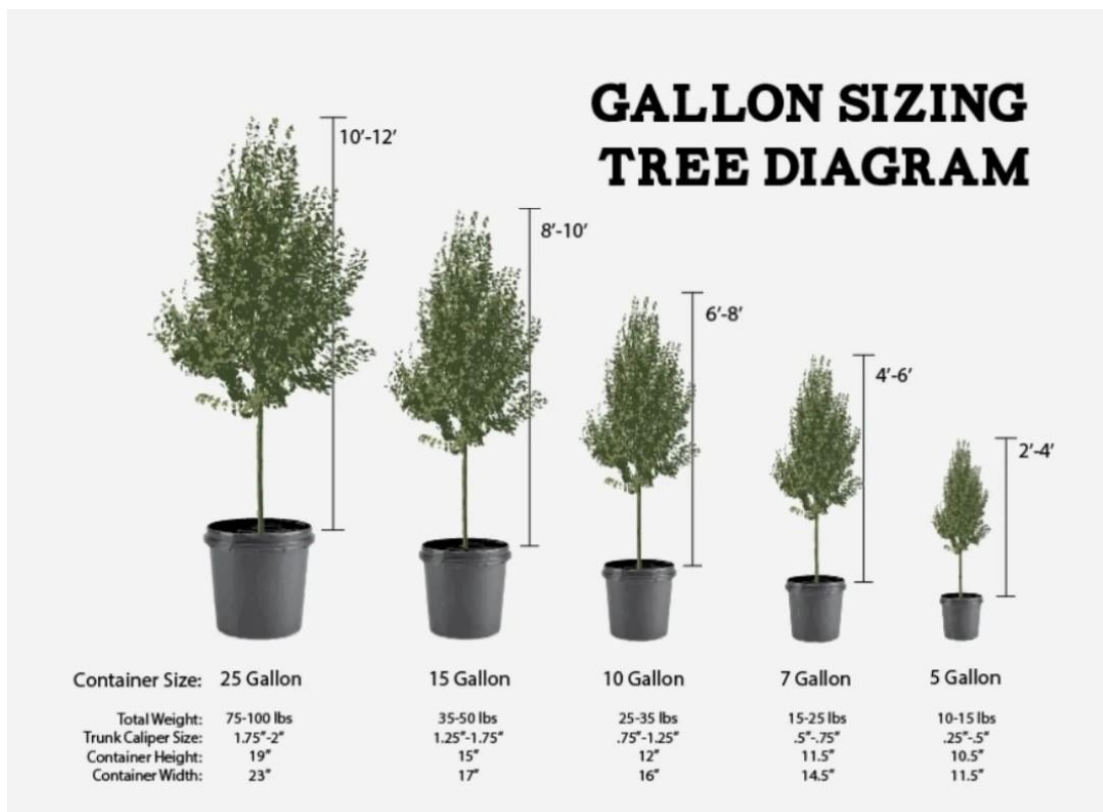


Figure 3 Containerized Stock Gallon Sizes

¹Tree Rows 4 U (<https://treerows4u.com/articles/f/understanding-nursery-tree-sizes>)

Species Selection

Species selection includes a diverse mix of native tree and shrub species well-suited to each planting site's ecological conditions and management objectives. Selection of tree and shrub species will be based on their suitability to the planting site's soil, water availability, climate, general growing conditions, and the design objectives. Consideration and incorporation of tree and shrub species not native to North Dakota will include species that have proven resilient, adaptable, and ecologically valuable within state park settings. Tree and shrub species lists have been developed for each park. See Table 6 for Grahams Island State Tree and Shrub List as an example.



Figure 4 Containerized stock planting at Fort Abraham Lincoln State Park

North Dakota State Park Tree and Shrub Planting
Suggested Native Trees and Shrubs

The following is a list of native tree and shrub species currently growing at the most state parks and other species (noted with *) that are currently not native to the park but suitable for plantings. Primary criteria for additional species selection based on soils and species ability to withstand moisture stress and limited maintenance. Y = best, well adapted M= Moderately well adapted and N= Not well adapted, generally not recommended for new plantings at the park.

Moisture Stress/low maint.	Mature Height'	Common Name	Latin Name
Y	45-65	American elm	<i>Ulmus americana</i>
Y	18-20	Boxelder	<i>Acer negundo</i>
Y	6-14	Buffaloberry	<i>Shepherdia argentea</i>
Y	40-70	Bur oak	<i>Quercus macrocarpa</i>
Y	12-25	Chokecherry	<i>Prunus virginiana</i>
Y	50-100	Cottonwood	<i>Populus deltoides</i>
M	3-6	Black currant	<i>Ribes americanum</i>
M	3-6	Golden currant	<i>Ribes odoratum</i>
Y	35-65	Green ash	<i>Fraxinus pennsylvanica</i>
M	40-60	Common hackberry	<i>Celtis occidentalis</i>
Y	15-20	Hawthorn	<i>Crataegus chrysoarpa</i>
Y	6-15	Juneberry	<i>Amelanchia alnifolia</i>
Y	45	Peach-leaved willow	<i>Salix amygdaloides</i>
Y	50-70	Ponderosa pine	<i>Pinus ponderosa</i>
Y	20-40	Rocky Mountain juniper	<i>Juniperus scopulorum</i>
Y	5-9	Silverberry	<i>Elaeagnus commutata</i>
Y	3-8	Skunk bush sumac	<i>Rhus trilobata</i>
Y	2-4	Tall cinquefoil	<i>Potentilla arguta</i>
Y	8-10	American plum	<i>Prunus americana</i>
Y	4-6	Wild rose	<i>Rosa arkansana</i>
Y	15-20	Amur maple*	<i>Acer ginnala</i>
Y	60-80	Silver maple*	<i>Acer saccharinum</i>
Y	30-60	Black hills spruce	<i>Picea glauca var densata</i>
Y	30-65	Colorado blue spruce*	<i>Picea pungens</i>
M	12-25	Canada red chokecherry*	<i>Prunus virginiana 'Canada Red'</i>
Y	40-50	Siouxland cottonwood*	<i>Populus deltoides' siouxland'</i>
Y	40-50	Hybrid poplar*	<i>Populus hybrids</i>
Y	4-6	Woods Rose	<i>Rosa woodsii</i>

Sources: North Dakota Tree Handbook <https://www.ag.ndsu.edu/trees/handbook/ndhand-1.htm>
 Web Soil Survey <https://websoilsurvey.nrcs.usda.gov/app/>
 North Dakota Tree Selector <https://www.ag.ndsu.edu/tree-selector>
 NDDOT ND Native Woody Vegetation List
https://www.dot.nd.gov/manuals/design/designmanual/wordfiles_design/environmental/Appendix%20E10%20Native%20Woody%20Vegetation%20List.pdf

Figure 5 ND State Park Tree and Shrub Planting Suggested Species List

Procurement of Plant Materials, Appurtenances, and Installation

The procurement bid process will follow the requirements outlined in North Dakota Century Code Chapter 48-01.2 (Public Improvement Bids and Contracts). The procurement bid process will accept bids from reputable nurseries that prioritize disease resistance and suitability for local environmental conditions and can ensure that tree and shrub planting stock are of high-quality plant materials that contribute to planting success and sustainability. Bid packages will be prepared with consideration to the contracting and material availability climates in the areas of the state where the parks are located. Depending on the circumstances of the bidding climate at the time of implementation, the potential of grouping parks with similar planting scenarios and the on-site constraints of each park, supply and installation might be bid separately or together, and with the opportunity for multiple, regionally based vendors. Vendors will be required to be bonded and meet state requirements for liability insurance.

Table 5 Example of Specific Park Tree and Shrub List

GRAHAMS ISLAND STATE PARK - TREE PLANT LIST		Tree Info				
COMMON NAME	SCIENTIFIC NAME	Spread (ft)	Height (ft)	Sun	Zone	Soil Preference
CANOPY/ LARGE TREES (Heights >35 feet)						
BOX ELDER	<i>Acer negundo</i>	30-50	35-80	full	3	Moist, wide-range
RED MAPLE	<i>Acer rubrum</i>	30-50	40-70	full/part	3	Moist, slightly acidic
SILVER MAPLE	<i>Acer saccharinum</i>	35-50	50-80	full/part	3	Moist, acidic
BALSAM POPLAR	<i>Populus balsamifera</i>	25-40	50-80	full	1	Moist to wet
HACKBERRY	<i>Celtis occidentalis</i>	50	70	full	3	Wide-range
COTTONWOOD	<i>Populus deltoides</i>	40-70	65-100	full	2	Moist
QUAKING ASPEN	<i>Populus tremuloides</i>	30	50	full	1	Wide-range
BUR OAK	<i>Quercus macrocarpa</i>	80	80	full	2	Dry to moist
AMERICAN LINDEN	<i>Tilia americana</i>	30-50	50-80	full to shade	2	Moist, well-drained
AMERICAN ELM 'PRAIRIE EXHIBITION'	<i>Ulmus americana 'Lewis & Clark'</i>					
AMERICAN ELM 'PRINCETON'	<i>Ulmus americana 'Princeton'</i>					
ELM 'NEW HORIZON'	<i>Ulmus 'New Horizon'</i>					
GREEN ASH	<i>Fraxinus pennsylvanica</i>		50-70			
HOP-HORNBEAM (IRONWOOD)	<i>Ostrya virginiana</i>		25-40			
UNDERSTORY TREES (Height <35 feet)						
AMERICAN PLUM	<i>Prunus americana</i>	12-20	12-20	full/part	4	Wide-range
CHOKECHERRY	<i>Prunus virginiana</i>	20	25-45	full/ part	2	mid-range
PEACH-LEAF WILLOW	<i>Salix amygdaloides</i>	25-35	35-40	full/part	2	Moist, well-drained
PIN CHERRY	<i>Prunus pensylvanica</i>		25-35			
SMALL TREES/ LARGE SHRUBS (Height <20 feet or Shrub-like Quality)						
AMUR MAPLE	<i>Acer ginnala</i>	15-20	15-20		2	
BUFFALOBERRY	<i>Shepherdia argentea</i>	8-12	6-20		2	
SMOOTH SUMAC	<i>Rhus glabra</i>		10-20			
JUNEBERRY	<i>Amelanchia alnifolia</i>		6-15			
CURRANT	<i>Ribes sp.</i>		3-6			
NANNYBERRY	<i>Viburnum lentago</i>		10-18			
HAWTHORN	<i>Crataegus rotundifolia</i>		15-20			
SILVERBERRY	<i>Elaeagnus commutata</i>		5-9			
SKUNKBUSH SUMAC	<i>Rhus trilobata</i>		3-8			
WOOD'S ROSE	<i>Rosa woddsii</i>		4-6			
TALL CINQUEFOIL	<i>Potentilla arguta</i>		2-4			
CANADA RED CHOKECHERRY	<i>Prunus virginiana 'Canada Red'</i>		12-25			
WILD ROSE	<i>Rosa arkansana</i>		4-6			
RED OISER DOGWOOD	<i>Cornus sericea</i>		6-12			
SANDCHERRY	<i>Prunus besseyi</i>		4-6			
CONIFERS						
ROCKY MOUNTAIN JUNIPER	<i>Juniperus scopulorum</i>	10-15	15-45	full	3	Well-drained
BLACK HILLS SPRUCE	<i>Picea glauca var. densata</i>	15	40	full	2	Dry to moist
PONDEROSA PINE	<i>Pinus ponderosa</i>	25	80	full	3	Dry to average
COLORADO BLUE SPRUCE	<i>Picea pungens</i>		30-65			

Green Ash Note: Planting green ash trees can be problematic due to the presence of the emerald ash borer (EAB), an invasive insect species that has devastated ash tree populations in North America. To mitigate the impact of the emerald ash borer, it has been recommended to avoid planting new ash trees, especially those that are susceptible to infestation. Instead, it's advisable to diversify tree species in landscapes and focus on planting species that are resistant to EAB or less susceptible to its damage.

Tree and Shrub Installation

The tree planting project aims to plant a total of 1/3 of all trees and shrubs each year, with a target of planting all trees and shrubs by the end of the third planting season. This approach ensures a steady progression toward the overall goal.

Tree planting contractors will play a crucial role in installing tree and shrub planting projects, ensuring that the planting process is carried out efficiently and effectively and that project specifications are followed.

- Standard planting details and accompanying specifications relevant to the various planting conditions found at our state park properties, as well as planting layout diagrams will be completed for each bid package.
- Contractors/vendors awarded contracts will, before commencing delivery and installation, review provided project plans and planting designs, specifications and contract conditions with the project manager and field inspection staff.
- Contractors will procure the necessary equipment, tools, and materials for planting, such as soil amendments, planting stakes and mulch.
- Contractors will document installation activities, including plant quantities, species planted, planting techniques used, and any challenges encountered during the process. NDPRD project manager and field inspection staff will also document activities, review materials and plant stock prior to or at delivery on site, conduct quality control inspections and approve payments.
- Contractors may also be asked to assist NDPRD staff in conducting post-installation inspections or evaluations to assess the success of planting efforts, identify any warranty actions and identify opportunities for improvement or follow-up maintenance, typically at the end of the 1st. Growing season.

Post Planting Assessments and Evaluations

Post-planting assessments and evaluations are crucial steps in ensuring the success and effectiveness of a tree planting project. Annual tree and shrub planting assessments will be conducted to track survival and evaluation of post-planting maintenance. All new tree and shrub plantings will be mapped using ArcGIS Online ESRI Field maps. Tree planting assessment reports will be distributed to all parks.

Post-Installation Management

Managing post-tree planting maintenance involving fulltime, long-term, and seasonal employees and volunteers requires careful planning and coordination. Task allocation, supervision, oversight, and work schedules will be done at the park level and with overall coordination and quality control undertaken by the Natural Resources Division. All seasonal and volunteer time and activity will be closely tracked and recorded.

- **Year 1:** Establishment and Initial Growth Phase includes regular watering, weed control, monitoring for pests or diseases, staking and support, and installing fence and bark protectors.
- **Year 2:** Growth and Development Phase includes supplemental watering as needed, weed control, monitoring for pest and disease, light pruning to remove any dead or damaged branches, fertilization only after soil test, and replenishing mulch.
- **Year 3+:** Maturation and Maintenance Phase includes supplemental watering as needed, monitoring for pests and disease, light pruning to remove any dead or damaged branches, fertilization but only after soil test, and replenishing mulch.

Benefits

By strategically incorporating tree and shrub plantings, state parks can not only enhance their natural beauty but also improve the overall experience for visitors by creating more visually appealing, tranquil, and environmentally sustainable spaces. Tree and shrub planting in state parks offers numerous environmental and recreational benefits:

- **Recreation and Education:** Trees and shrubs provide recreational activities such as hiking, birdwatching, and nature photography opportunities. State parks often use native vegetation for educational purposes, teaching visitors about local ecosystems and the importance of conservation.
- **Shade and Cooling:** In state parks, shaded areas offer visitors a comfortable environment for recreation and relaxation during the hot summer months. During cooler shoulder seasons, strategically located plantings can provide favorable microclimates and modify strong winds.
- **Privacy:** In areas where campsites are in close proximity to one another or park facilities, strategically planted trees and shrubs can provide privacy for park users and residents alike. Trees can also help to delineate public, semi-private and private spaces.
- **Soil Conservation and Erosion Mitigation:** Tree roots help stabilize soil, reducing erosion and preventing sedimentation in streams and rivers. This helps to protect water quality and maintain healthy aquatic ecosystems. Tree and shrub roots can also provide direct resistance to highwater erosive forces along streambanks in our parks.
- **Biodiversity:** Planting diverse species of trees and shrubs increases habitat diversity, supporting a wide range of wildlife, including birds, insects, and mammals. This promotes biodiversity and contributes to the overall health of the ecosystem.
- **Aesthetic Value:** Planting trees and shrubs enhances the visual appeal of state parks, making them more attractive destinations for visitors. Well-landscaped areas create scenic vistas, enhance local soundscapes, and contribute to a sense of tranquility and natural beauty. Spring and fall colors can attract additional visitation, especially in the eastern parks and recreation areas.

Table 6 Project Timeline and Tasks

Tasks	Jul 2024- Nov 2024	Dec 2024- June 2025	Jul 2025- Nov 2025	Dec 2025- June 2026	Jul 2026- Nov 2026	Dec 2026- June 2027	July 2027- Nov 2027
Parks site Inventory map updates	Blue	Blue					
Parks site category map updates	Blue	Blue					
Parks Tier I updates	Blue	Blue					
Tree planting assessments	Green		Green		Green		Green
Landscape Matrices Updates/Planting Designs		Blue	Blue	Blue	Blue	Blue	Blue
Species Selection per park		Blue	Blue	Blue	Blue	Blue	Blue
Bid and Procurement		Red					
Tree & Shrub Site Prep & Installation		Green	Green	Green	Green	Green	Green
Post Planting Assessments	Green		Green		Green		Green
Post Installation Management			Green		Green		Green
Status Reports	Orange	Orange	Orange	Orange	Orange	Orange	Orange
Planning	Field Work		Financial			Status Report	

Project Need: State parks play a vital role in preserving natural landscapes, providing recreational opportunities, and safeguarding biodiversity. The challenges facing state park tree plantings and native woodlands, especially regarding mature and dying cottonwood forests, insect pests, disease, flooding, and funding for replacement trees and shrubs, as well as the development of new tree and shrub plantings in new development areas, are indeed multifaceted:

- Funding Constraints – limited budgets and competing priorities.
- Replacement Trees and Shrubs – cost of replacement, native species selection for containerized sock is limited
- Maintenance Needs - watering, mulching and protection from pests and wildlife
- Development Area -integrating tree and shrub plantings into new development plans

Addressing these needs and challenges requires a combination of strategic planning, collaborative partnerships, and innovative funding mechanisms.

Project Urgency: Given that since 2020 North Dakota Parks and Recreation has seen record visitation and usage, urgent need to address tree replacement and management goals prioritizing and accelerating tree planting initiatives in state parks and native woodlands is essential. By taking immediate action to plant trees and restore degraded tree plantings and woodlands we can make meaningful progress towards conserving biodiversity and enhancing the resilience of our natural ecosystems.

Project Innovative Features: ArcGIS Online and Field Maps offer innovative tools for conducting tree planting assessments and tree risk assessments, enhancing efficiency, accuracy, and data-driven decision-making in forestry. Here are some ways these technologies are being used in ND state parks:

Tree and Shrub Planting Mapping and Inventory: ArcGIS – Field Maps are being used to create detailed maps and inventory databases of existing tree populations, including species, size, condition, management needs and location. Data included trees and shrubs that have failed and need to be replaced. Refer to for the sample tree planting assessment report map filtering out replants for 2024.

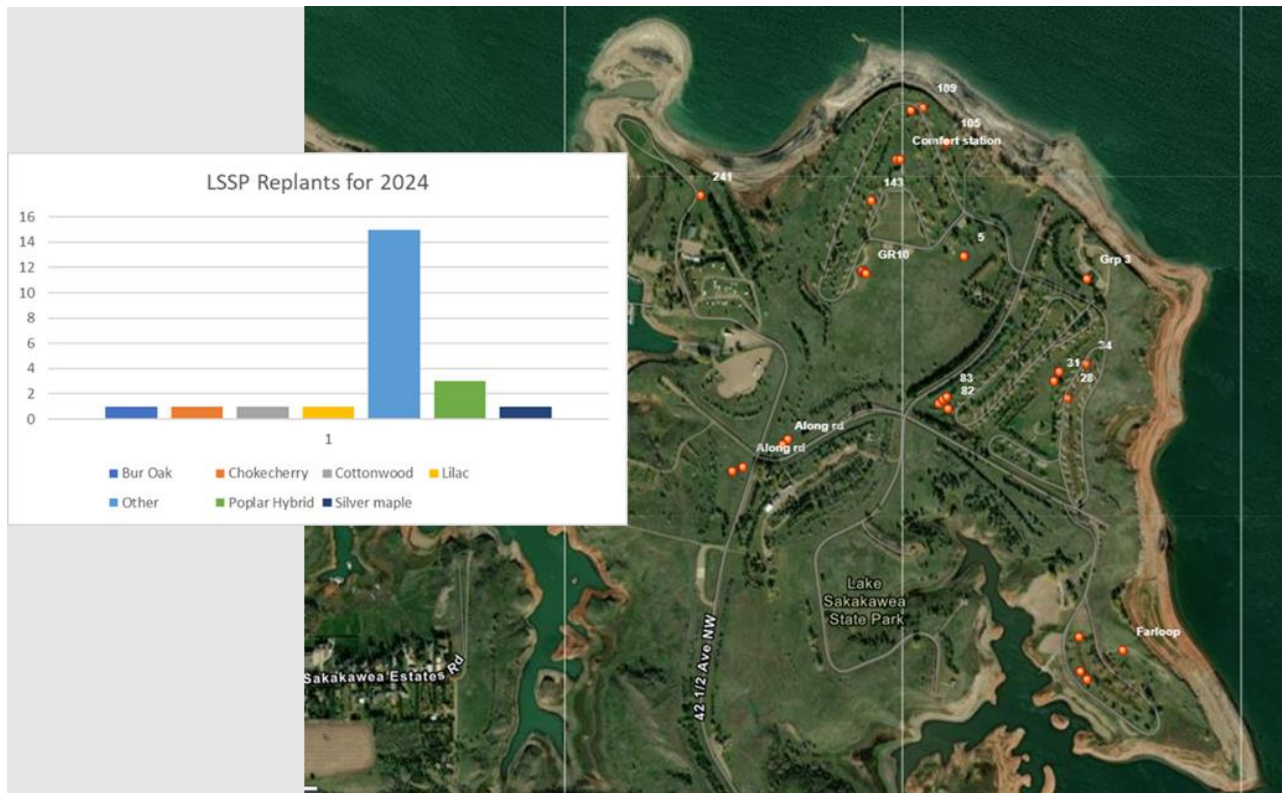


Figure 6 Sample Tree Planting Assessment Report Filtering out Replants for 2024.

Tree Risk Assessment and Management: Arc GIS – Field Maps are currently being used to conduct annual tree risk assessments which rely on identifying and assessing structural conditions to assess failure potential. Defect is the term commonly used to identify a condition or characteristic that is structurally weak or contributes to a structural weakness. All trees with 6” or greater diameters with potential targets are mapped using ArcGIS Online Field Map software, GNSS receiver, antennae, and iPad. Tree risk mitigation recommendations are made for each tree, such as Critical Removals, Critical Prunes, Removal, pruning, or annual inspection. All attempts are made to replace tree in high use area at a 2: 1 ratio and a 1:1 ratio for all other areas.

By leveraging ArcGIS and Field Maps in tree planting assessments and tree risk assessments, natural resources team can streamline data collection, improve decision-making, and enhance collaboration across project teams, leading to more effective and sustainable management of urban and natural tree populations.

Project Process

The tree planting process involves several key steps, from initial assessment and species selection, purchase, installation, and maintenance.

1. Parks site Inventory and category map updates
2. Parks Tier I A updates
3. Annual Tree and shrub planting assessments
4. Annual Tree Risk Assessments
5. Landscape Matrices Updates/Planting Designs
6. Species Selection – native species preference
7. Tree and shrub bids and procurement – tree sourcing from local nurseries
8. Post-planting care – Follow ND Forest Service 3-year maintenance plan

By following a systematic approach to tree and shrub planting, from assessment and species selection to purchase and installation, the Department can ensure the success and sustainability of tree-planting projects while enhancing the ecological, aesthetic, and social value of state parks and natural landscapes.

Is this project part of a Comprehensive Conservation Plan? Yes No

We have a system wide plan for recurring assessment, removal and planting as well as park specific natural resources management plans of which, this project will play a significant role.

Management of Project

The management of this project will span multiple divisions of North Dakota Parks and Recreation. The Outreach and Engagement Division will oversee the grant administration process. The Business Services Division will carry out the procurement process in accordance with North Dakota Century Code Chapter 48-01.2. And finally, the Natural Resources Division along with the Parks Operation Division will oversee the timeline and implementation of this project, with both Divisions working with Planning and Projects during planning phases.

Natural Resources Division: The Natural Resources Division Chief will serve as both the project and task content manager.

The Natural Resources Division conduct all tree planting assessments and conduct all tree planting spatial and tabular data updates. Staff are responsible for compiling all data in Tree Planting Assessments Reports. Natural resources staff will also assist in the selection and purchasing of trees and shrubs. Natural Resources Division Chief will work with Business Services Division in the procurement of tree stock and in the contractor bid process.

Natural Resources Division seasonal natural resource technicians and Specialists will assist park staff in site preparation, tree plantings and maintenance tasks.

Field Operations: Park Rangers and Groundskeepers will assist with tree management post installation tasks.



A tree service contractor's primary responsibility is to execute tree planting operations efficiently and effectively. This involves delivery of stock, planting trees according to industry standards, and ensuring proper spacing and alignment. Contractor services expenses will be split between OHF request of \$531,570 and Cash Match of \$177,190.

Volunteers will play a crucial role in maintaining tree plantings in various way including planting and watering, mulching, and weeding and the installation of deer fence, tree tubs and bark protectors.

Evaluation

Post-planting tree assessments are conducted after trees have been planted to evaluate their health, growth, and overall performance. These assessments are essential for determining the success of the tree planting project and identifying any issues that may need to be addressed. Contractors may conduct post-installation inspections or evaluations to assess the success of planting efforts and identify opportunities for improvement or follow-up maintenance, typically at the end of the first Growing season.

Annual tree and shrub planting assessments will be conducted to track survival and evaluation of post-planting maintenance. All new tree and shrub plantings will be mapped using ArcGIS Online ESRI Field maps. Tree planting assessment reports will be distributed to all parks. Key aspects typically covered in post-planting tree assessments include survival rate, environmental stressors, pest and disease incidence, and maintenance needs.

Table 7 Project Costs

PLANTS	ESTIMATED TOTAL EXPENSE COUNT TIER 1 SITES	UNIT	UNIT COST	PROJECTED PLANTING COST TIER 1 WITHIN 3 YEARS
CANOPY TREES	1762	EACH	\$225	\$396,315
UNDERSTORY TREES	468	EACH	\$170	\$79,594
CONIFER TREES	292	EACH	\$240	\$69,888
SHRUBS	441	EACH	\$80	\$35,264
PLANT ACCESSORIES				
TUBES/ STAKES	1487	TREE	\$60	\$89,130
FENCING (DEER PROTECTION)	1022	TREE	\$100	\$102,150
MATERIALS				
MULCH	1095	CUBIC YARD	\$120	\$131,424
CONTRACTOR SERVICES				
PLANT, TRANSPORT & INSTALLATION	1	LUMP SUM	\$708,760	\$708,760
MAINTENANCE				
3-YEAR PLANT ESTABLISHMENT	1	LUMP SUM	\$150,375	\$150,375
TOTAL				\$1,762,900

Table 8 Project Budget and Match

Project Expense	OHF Request	Applicant Match Share (Cash)	Applicant Match (In-kind)	Applicant Match Share (Indirect)	Other Project Sponsor's Share	Total Each Project Expense
CANOPY TREES	\$ 371,315				\$ 25,000	\$ 396,315
UNDERSTORY TREES	\$ 79,594					\$ 79,594
CONIFER TREES	\$ 69,888					\$ 69,888
SHRUBS	\$ 35,264					\$ 35,264
TUBES/ STAKES	\$ 89,130					\$ 89,130
FENCING (DEER PROTECTION)	\$ 102,150					\$ 102,150
MULCH	\$ 131,424					\$ 131,424
PLANT TRANSPORT & INSTALLATION	\$ 531,570	\$ 177,190				\$ 708,760
3-YEAR PLANT ESTABLISHMENT	\$ -	\$ -	\$ 150,375			\$ 150,375
Total Costs	\$ 1,410,335	\$ 177,190	\$ 150,375	\$ -	\$ 25,000	\$ 1,762,900

Budget Narrative

Overall, volunteers contribute significantly to the maintenance of tree plantings by providing labor, expertise, and community engagement, ultimately contributing to the health and vitality of urban forests and green spaces. For budget purposes volunteer hours have been listed under in-kind match. It is estimate that over 150 volunteers will participate in this tree planting project. Accumulating over 600 hours, resulting in approximately \$12,000 sponsor match.

Seasonal and long-term temporary staff are paid through special fund revenue dollars. It is estimated that over 9000 hours of seasonal time will be dedicated to post tree and shrub establishment tasks over the three-year project. This is equivalent to approximately \$138, 375 which is to be used as the in-kind match.

In 2024 North Dakota Parks and Recreation received \$25,000.00 from the ND Forest Service American the Beautiful Tree planting grant. It is anticipated that the Department will apply for this grant at least once during the life of this Outdoor Heritage grant. Grant amount is capped at \$25,000.

Sustainability

North Dakota Parks and Recreation recently established the Outreach and Engagement Division which is dedicated to engaging stakeholders and seeking funding from various channels such as grants, donations, sponsorships, partnerships, and revenue-generating activities. The Outreach and Engagement Division is dedicated to seeking funds for the long-term sustainability of the department tree planting and subsequent maintenance projects.

Partial Funding

In the event that this grant proposal is partially funded, the Department can administer the project through a proportional reduction in the number of trees planted. Despite the potential for a decrease in the project scope, the Department remains committed to maximizing the impact of the project within the revised scope while still including all park properties but scaling back the

number of trees and shrubs. Project administrators and managers will diligently prioritize activities, streamline processes, and leverage resources efficiently to achieve our objectives and deliver meaningful outcomes. A partial funding still represents a valuable opportunity to continue our work towards tree and shrub plantings in ND State Parks and we are confident that with careful planning and strategic execution, we will make significant strides towards our goal.

Partnership Recognition

The department will continue to strengthen tree planting partnership recognition strategies acknowledging the contributions of the Outdoor Heritage Fund who have supported ND state park tree plantings efforts for over 10 years. Strategies include:

- **Create Branded Materials:** Develop branded materials such as certificates and plaques, to formally recognize OHF for their contributions to tree planting efforts.
- **Host Recognition Events:** Organize special events or ceremonies to publicly recognize and celebrate the contributions of partners.
- **Share Success Stories:** Share success stories and impact metrics to showcase the collective achievements of the partnership.
- **Engage Media and Public Relations:** Leverage media and public relations channels to amplify the visibility of the partnership and its contributions to tree planting initiatives.
- **Provide Regular Updates:** Keep partners informed and engaged by providing regular updates on project progress, milestones reached, and upcoming opportunities for involvement.

Can you meet all the provisions of the sample contract? Yes No

North Dakota Parks and Recreation Department Comprehensive Tree Planting Strategy

Goal: The goal is to create and maintain healthy, diverse ecosystems anchored by appropriate native tree and shrub plantings within state parks that support wildlife, provide recreational opportunities, contribute to broader conservation efforts, and enhance the visitor experience. North Dakota Parks and Recreation intends to undertake its most extensive statewide tree planting initiative to date. The requested funding will allow the department to execute a strategic and concerted tree and shrub planting program which will cover every North Dakota State Park.

Strategy: To assess, categorize, develop landscape planting templates, install, evaluate, and manage comprehensive tree and shrub plantings in high-priority state park landscapes starting with Tier I priority areas.

Background- Strategic Planning: In late 2023, the North Dakota Parks & Recreation Department (NDPRD) identified the need to scope out the potential magnitude of a state-wide, concerted program to increase tree and large shrub plantings at state parks. With the department's mission being to "Enrich generations through experiences that connect people and places", increasing attention is being placed on the visitor experience, from provision of shade to enhancement of wildlife viewing through habitat enhancements. Thoughtful plantings of trees and large shrubs provide many of these enhancements.

Planting efforts to date have been of relatively small volume with small stock and primarily aimed at replacing or supplementing existing trees. Landscape architects from the firm Short Elliott Hendrickson, Inc (SEH) were retained to bring third party eyes to a set of representative parks to develop typical model planting design templates, assist in establishing priorities and in preparing cost estimates.

Areas were calculated and the degree of existing tree cover applicable to the ideal templates estimated, generating tree numbers and sizes required. Applied against cost factors for supply, contracted planting and related costs, costs generated for each of the representative parks for a long term, complete program. Per acre averages of these planting program costs were then applied to the remaining parks in the NDPRD system and divided into manageable 3-year program increments for a statewide planting program.

Landscape architects from the firm Short Elliott Hendrickson, Inc initiated the first steps of NDPRD's Comprehensive Tree Planting Strategy, including inventory maps, land-use category maps, and a landscape matrix database.

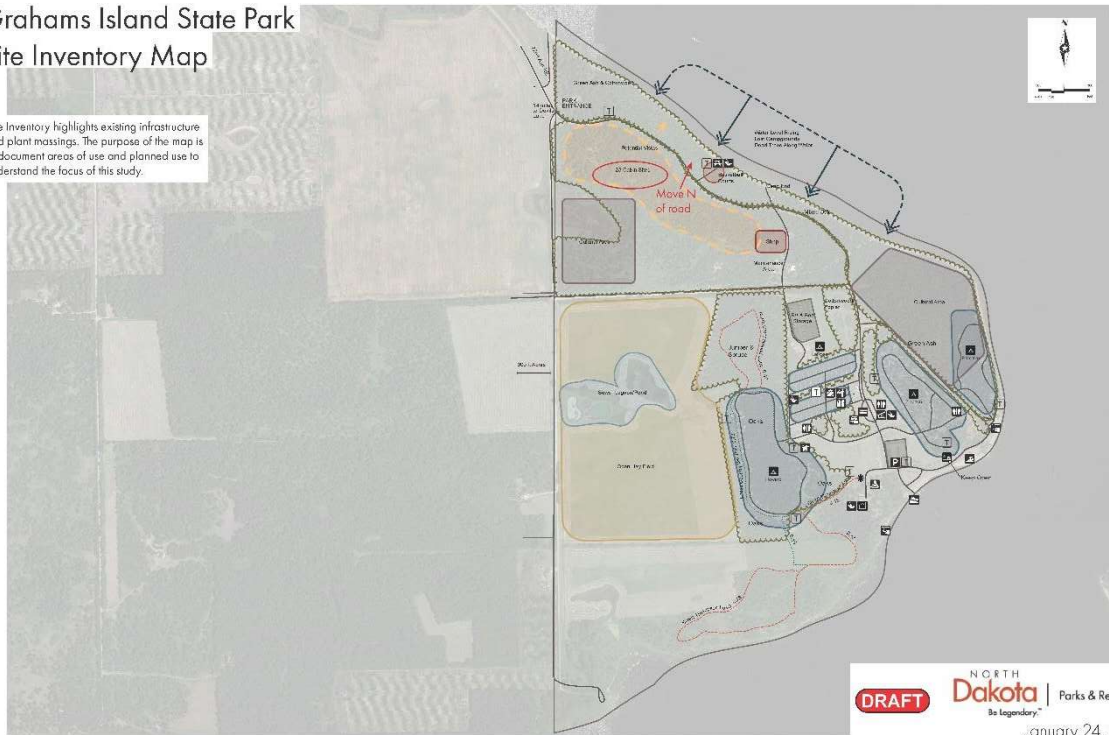
In person site review, discussions with NDPRD staff and aerial imagery review and analysis allowed for use area types to be identified and classified into four priority tiers. Tier I and Tier II

areas were identified as the areas having most impact on the visitor experience and the priority for first phases of a planting program.

The site inventory map highlights existing infrastructure and larger plantings. The purpose of the map is to document areas of use and planned use areas. Areas on the maps include Cabin sites, campgrounds, cultural areas, halcyards, maintenance areas, native grasslands, RV and boat storage, sewer lagoon/pond, shelterbelts, shops, and tree rows.

Grahams Island State Park Site Inventory Map

Site Inventory highlights existing infrastructure and plant massings. The purpose of the map is to document areas of use and planned use to understand the focus of this study.



Lake Sakakawea State Park

Site Inventory Map



Site Inventory highlights existing infrastructure and plant massings. The purpose of the map is to document areas of use and planned use to understand the focus of this study.

Fort Stevenson State Park Site Inventory Map

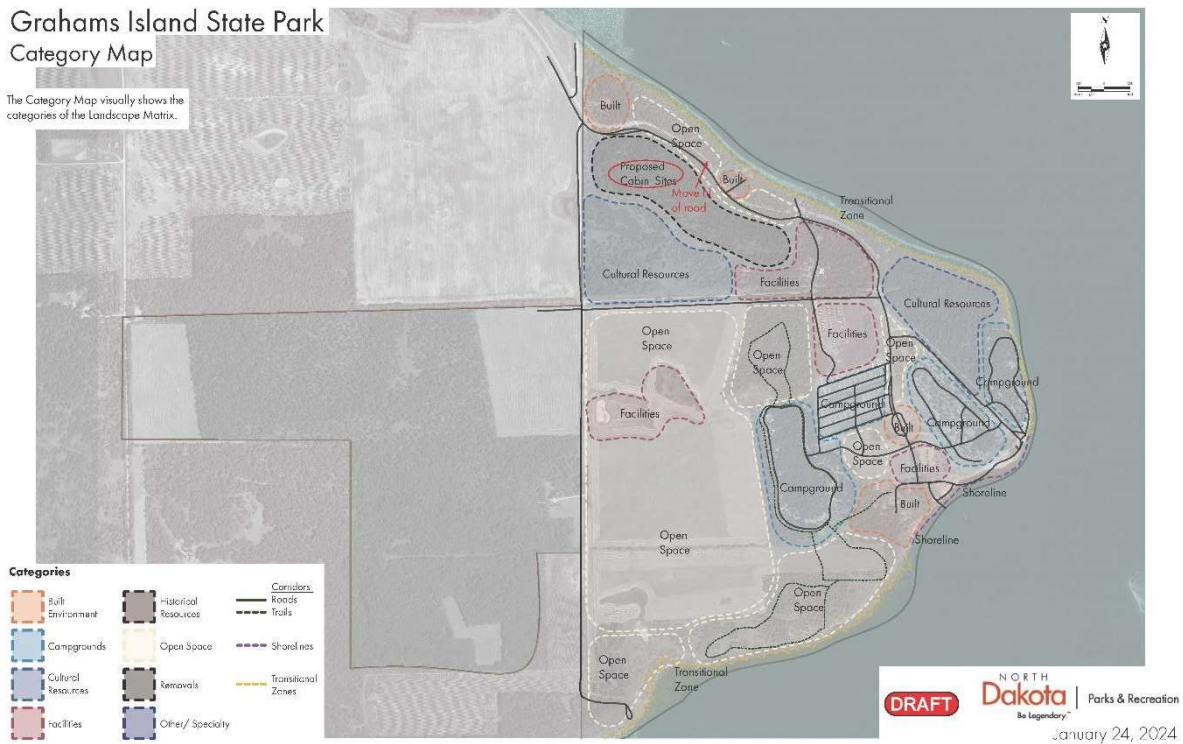


Site Inventory highlights existing infrastructure and plant massings. The purpose of the map is to document areas of use and planned use to understand the focus of this study.

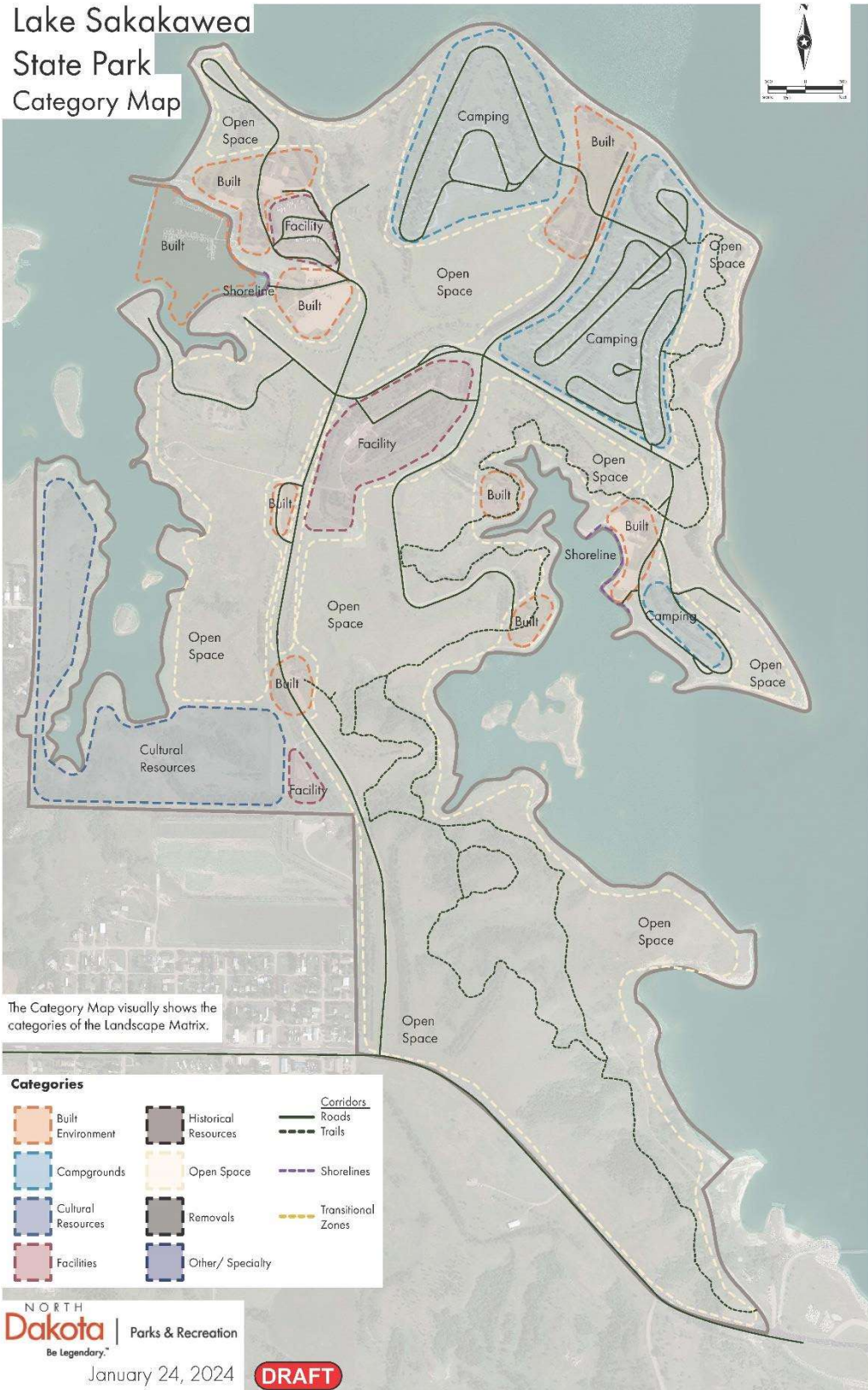
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From the site inventory map a site category map was created which is a visual representation of the Landscape matrix.

- Built Environment (entrance, visitor and activity centers, cabins, amphitheater's)
- Campground (dense, dispersed, and primitive camping sites)
- Corridors (roadways and trails)
- Cultural Resources (Native American cultural and sacred places)
- Facilities (maintenance buildings and areas, storage areas)
- Historical Resources (structures, elements and interpretive)
- Open Space (wooded areas unprogrammed, cultivated, programmed i.e., playgrounds)
- Shorelines (boat launches, beaches, and fishing area)



Lake Sakakawea State Park Category Map



The Category Map visually shows the categories of the Landscape Matrix.

Categories		

Fort Stevenson State Park

Category Map

The Category Map is an overview summary of various categories as defined in the Landscape Matrix Database for Fort Stevenson State Park. Actual park uses, programming, site features, and conditions may vary within the park.



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Each subcategory e.g., Dispersed campgrounds, cabins, trails was then assigned a tier level from I-IV with I being highest priority for tree plantings. Tiers levels categorized planting site priorities to allow for strategic planning, resource allocation, and decision-making in tree and shrub planting initiatives within state park landscapes.

Tier I areas include visitor centric areas such as campgrounds, visitor centers, activity centers, concessions, and marina approaches.

- Tier II areas include visitor facing facilities such as entry roadways, trails, and primitive camp sites.
- Tier III areas include maintenance areas requiring shade or screening, areas that have experienced significant removals, programmed open spaces and waterfront activity areas such as beaches, fishing areas, boat launches and areas anticipated for future development where early, planned tree planting could enhance the finished product.
- Tier IV areas include unprogrammed open space, shelterbelts, existing tree stands, treatment lagoon areas and areas which may have a high likelihood of sensitive cultural sites and artifacts or paleontological features.

Aerial photo interpretation was used for approximating dimensions of all sub-categories. Based on dimensions and acres, tree counts were estimated for each tree type such as canopy trees, understory and small trees, conifers, and shrubs. Values in the landscape database matrix can then be manipulated based on years, funds available or percentage of tree count goal to meet. A summary of all parks with estimated park use areas identified for proposed planting has also been generated.

Below are three examples of the Landscape Matrix Databases; Grahams Island, Lake Sakakawea and Fort Stevenson State Parks.

GRAHAM'S ISLAND STATE PARK LANDSCAPE MATRIX DATABASE

CATEGORY (Subcategory)	TIER LEVEL ²	OVERALL DIMENSION FROM CATEGORY PLAN ³	UNIT	CANOPY/LARGE TREE RATE (TREE COUNT / DIMENSION UNIT)			UNDERSTORY/SMALL TREE RATE (TREE COUNT / DIMENSION UNIT)			CONIFER TREE RATE (TREE COUNT / DIMENSION UNIT)			PROJECTED PERCENT OF TREE PLANTINGS ⁴	CANOPY / LARGE TREE COUNT	UNDERSTORY / SMALL TREE COUNT	CONIFER TREE COUNT	
				TREE COUNT	DIMENSION	UNIT	TREE COUNT	DIMENSION	UNIT	TREE COUNT	DIMENSION	UNIT					
BUILT ENVIRONMENT																	
Built Environment - Entry/Visitor Activity Centers	II	280,000	SQ FT	4	10,000	SQ FT	3	10,000	SQ FT	2	10,000	SQ FT	50%	40	30	20	
Built Environment - Cabins	III	30,000	SQ FT	3	7,500	SQ FT	2	7,500	SQ FT	3	7,500	SQ FT	25%	3	2	3	
Built Environment - Amphitheater	III	10,000	SQ FT	4	10,000	SQ FT	3	10,000	SQ FT	2	10,000	SQ FT	25%	1	1	1	
CAMPGROUND																	
Campground - Dense Camping Sites	II	450,000	SQ FT	8	15,000	SQ FT	2	15,000	SQ FT	2	15,000	SQ FT	10%	24	6	6	
Campground - Dispersed Camping Sites	I	1,200,000	SQ FT	6	12,000	SQ FT	1	12,000	SQ FT	1	12,000	SQ FT	50%	300	50	50	
Campground - Primitive Camping Sites	II	400,000	SQ FT	8	12,000	SQ FT	1	12,000	SQ FT	0	12,000	SQ FT	20%	53	7	0	
CORRIDORS																	
Corridors - Roadways	II	15,900	LIN FT	10	200	LIN FT	4	400	LIN FT	6	400	LIN FT	20%	159	32	48	
Corridors - Trails (Summer & Winter)	II	14,256	LIN FT	6	500	LIN FT	4	1000	LIN FT	6	1000	LIN FT	30%	51	17	26	
CULTURAL RESOURCES																	
Cultural Resources - Native American Cultural & Sacred Places	IV	50	ACRE	4	N/A	N/A	2	N/A	N/A	N/A	N/A	0%	0	0	0		
FACILITIES																	
Facilities - Maintenance Buildings/Areas	III	125,000	SQ FT	8	25,000	SQ FT	2	25,000	SQ FT	8	25,000	SQ FT	20%	8	2	8	
Facilities - Storage Areas/Treatment Areas	II	2,500	LIN FT	6	500	LIN FT	6	500	LIN FT	25	500	LIN FT	75%	23	23	94	
HISTORICAL RESOURCES																	
Historical Resources - Structures/Elements	IV	TBD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0%	0	0	0		
Historical Resources - Interpretive	IV	TBD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0%	0	0	0		
OPEN SPACE																	
Open Space - Wooded Areas	III	94	ACRE	30	1	ACRE	18	1	ACRE	0	1	ACRE	5%	141	85	0	
Open Space - Unprogrammed	IV	24	ACRE	3	1	ACRE	3	1	ACRE	3	1	ACRE	20%	14	14	14	
Open Space - Cultivated	IV	150	ACRE	0.67	1	ACRE	N/A	N/A	N/A	N/A	N/A	N/A	10%	10	0	0	
Open Space - Programmed (e playgrounds)	II	2	ACRE	16	1	ACRE	8	1	ACRE	10	1	ACRE	50%	16	8	10	
RECREATION																	
Recreation - Proposed 23 Cabin Sites	III	10	ACRE	12	1	ACRE	3	1	ACRE	0	1	ACRE	65%	78	20	0	
SHORELINES																	
Shorelines - Boat Landings/Beaches/Fishing	III	4	ACRE	4	1	ACRE	0	N/A	N/A	0	N/A	N/A	100%	16	0	0	
OTHER																	
Other/ Specialty - TBD																	
GRAHAM'S ISLAND STATE PARK TOTAL TREE COUNT																	
														937	297	280	

GRAHAM'S ISLAND STATE PARK TREE COUNT SUMMARY TABLE

TREE TYPE	TREE COUNTS PER TIER PRIORITY				TOTAL TREE COUNTS
	I	II	III	IV	
CANOPY/ LARGE TREES	300	366	247	24	937
UNDERSTORY/ SMALL TREES	50	123	110	14	297
CONIFER TREES	50	204	12	14	280

LAKE SAKAKWEA STATE PARK LANDSCAPE MATRIX DATABASE

CATEGORY / SUBCATEGORY	CATEGORY TYPOLOGY GRAPHIC (Y/N/No)	TIER LEVEL ¹	OVERALL DIMENSION FROM CATEGORY PLAN ²	UNIT	CANOPY / LARGE TREE RATE (TREE COUNT / DIMENSION UNIT)		UNDERSTORY / SMALL TREE RATE (TREE COUNT / DIMENSION UNIT)		CONIFER TREE RATE (TREE COUNT / DIMENSION UNIT)		PREDICTED PERCENT OF TREE PLANTINGS ³	CANOPY / LARGE TREE COUNT	UNDERSTORY / SMALL TREE COUNT	CONIFER TREE COUNT	NOTES
					TREE COUNT	DIMENSION	TREE COUNT	DIMENSION	TREE COUNT	DIMENSION					
BUILT ENVIRONMENT															
Built Environment - Entry/Visitor/Activity Centers/Mannins	Yes	I	42,000	SO FT	4	10,000	3	10,000	2	10,000	80%	13	10	7	
Built Environment - Cabins	Yes	III	40,000	SO FT	8	20,000	6	20,000	6	20,000	30%	5	4	4	
Built Environment - Amphitheater	No	III	60,000	SO FT	4	10,000	3	10,000	2	10,000	30%	7	5	4	
COMPGROUND															
Compground - Discs/Coning Sites	Yes	I	1,250,000	SO FT	3	7,000	2	7,000	1	7,000	90%	482	321	161	Dimension unit assumed to be two camping sites
Compground - Dispersed Camping Sites	No	I	750,000	SO FT	4	10,000	2	10,000	1	10,000	90%	270	135	68	Dimension unit assumed to be one camping site
Compground - Primitive Camping Sites	No	II	340,000	SO FT	4	4,000	2	4,000	0	4,000	50%	170	85	0	
CONDUITS															
Conduit - Roadways	Yes	II	18,200	LN/FT	10	200	4	400	6	400	40%	364	172	109	
Conduit - Tree Lines/ & Utility	Yes	II	26,400	LN/FT	6	500	4	1,000	6	1,000	20%	63	21	23	
CULTURAL RESOURCES															
Cultural Resources - Native American Cultural & Sacred Places	No	IV	N/A	ACRE	N/A	N/A	N/A	N/A	N/A	N/A	0%	0	0	0	No tree plantings assumed to protect resources. Change percent to add trees
FACILITIES															
Facilities - Maintenance Buildings/Decks	Yes	III	650,000	SO FT	8	25,000	2	25,000	8	25,000	30%	62	16	62	
Facilities - Storage Areas/ Treatment Areas	Yes	III	1,700	LN/FT	6	500	6	500	25	500	60%	12	12	51	
HISTORICAL RESOURCES															
Historical Resources - Structures/ Interpretive Areas	No	IV	N/A	ACRE	4	1	2	1	N/A	N/A	0%	0	0	0	
OPEN SPACE															
Open Space - Wooded Areas	No	III	50	ACRE	30	1	18	1	0	1	10%	150	90	0	
Open Space - Unprogrammed	No	IV	292	ACRE	3	1	3	1	3	1	20%	175	175	175	
Open Space - Native Prairie Areas	No	IV	22	ACRE	0.67	1	N/A	N/A	N/A	N/A	0%	0	0	0	
Open Space - Programmed (ie playgrounds/ recreation)	Yes	III	6	ACRE	16	1	8	1	10	1	100%	96	48	60	
REDEVELOPMENT															
Redevelopment of Marina C Shore & facilities	Yes	I	4	ACRE	16	1	20	1	10	1	80%	51	64	32	
SHORELINES															
Shorelines - Boat Launches/ Beaches/ Fishing	No	III	12	ACRE	4	1	0	N/A	0	N/A	100%	48	0	0	
OTHER															
Other/ Specialty - TBD															
LAKE SAKAKWEA STATE PARK TOTAL TREE COUNT												1968	1059	765	

¹ CATEGORY TYPOLOGY GRAPHIC REPRESENTS HIGH LEVEL CONCERNS FOR PLANTINGS AT NORTH DAKOTA STATE PARK FACILITIES FOR CERTAIN CATEGORIES AS INDICATED.

² TIER LEVELS (I-HIGHER PRIORITY, II, III, IV-LOWER PRIORITY), FOR TREE PLANTINGS

³ CATEGORY AREAS FOR 739 ACRE STATE PARK AREA

⁴ PREDICTED TREE PLANTING NEEDS NEXT 5 TO 10 YEARS

LAKE SAKAKWEA STATE PARK TREE COUNT SUMMARY TABLE

TREE TYPE	TREE COUNTS PER TIER PRIORITY				TOTAL TREE COUNTS
	I	II	III	IV	
CANOPY/ LARGE TREES	816	597	380	175	1968
UNDERSTORY/ SMALL TREES	530	179	175	175	1059
CONIFER TREES	268	141	181	175	765

FORT STEVENSON STATE PARK LANDSCAPE MATRIX DATABASE

CATEGORY (Subcategory)	CATEGORY TYPOLOGY GRAPHIC (Yes/No) ¹	TIER LEVEL ²	OVERALL DIMENSION FROM CATEGORY PLAN ³	UNIT	CANOPY/ LARGE TREE RATE (TREE COUNT #/ DIMENSION UNIT)		UNDERSTORY/ SMALL TREE RATE (TREE COUNT #/ DIMENSION UNIT)		CONIFER TREE RATE (TREE COUNT #/ DIMENSION UNIT)		PROJECTED PERCENT OF TREE PLANTINGS ⁴	CANOPY/ LARGE TREE COUNT	UNDERSTORY/ SMALL TREE COUNT	CONIFER TREE COUNT				
					TREE COUNT	DIMENSION	TREE COUNT	DIMENSION	TREE COUNT	DIMENSION								
BUILT ENVIRONMENT																		
Built Environment - Entry Vectors/ Activity Centers/ Marinas	Yes	I	900,000	SQ FT	4	10,000	SQ FT	3	10,000	SQ FT	2	10,000	SQ FT	324	243	162		
Built Environment - Cabins	Yes	III	100,000	SQ FT	3	7,500	SQ FT	2	7,500	SQ FT	3	7,500	SQ FT	20	13	20		
Built Environment - Amphitheater	No	III	10,000	SQ FT	4	10,000	SQ FT	3	10,000	SQ FT	2	10,000	SQ FT	2	2	1		
CAMPGROUND																		
Campground - Dense Camping Sites	Yes	I	150,000	SQ FT	2	3,600	SQ FT	1	3,600	SQ FT	0.5	3,600	SQ FT	75	38	19		
Campground - Dispersed Camping Sites	No	I	1,135,000	SQ FT	4	9,000	SQ FT	2	9,000	SQ FT	1	9,000	SQ FT	504	252	126		
Campground - Primitive Camping Sites	No	II	75,000	SQ FT	2	4,000	SQ FT	1	4,000	SQ FT	0	4,000	SQ FT	19	9	0		
CORRIDORS																		
Corridors - Roadways	Yes	II	12,500	LN FT	10	200	LN FT	4	400	LN FT	2	400	LN FT	125	25	13		
Corridors - Trails (Summer & winter)	Yes	II	47,520	LN FT	6	500	LN FT	4	1,000	LN FT	2	1,000	LN FT	171	57	29		
CULTURAL RESOURCES																		
Cultural Resources - Native American Cultural & Sacred Places	No	IV	11	ACRE	4	N/A	N/A	2	N/A	N/A	N/A	N/A	N/A	0	0	0		
FACILITIES																		
Facilities - Maintenance Buildings/ Areas	Yes	III	100,000	SQ FT	8	25,000	SQ FT	2	25,000	SQ FT	8	25,000	SQ FT	32	8	32		
Facilities - Storage Areas/ Treatment Areas	Yes	IV	6,500	LN FT	6	500	LN FT	6	500	LN FT	25	500	LN FT	62	62	260		
HISTORICAL RESOURCES																		
Historical Resources - Structures/ Interpretive Areas	No	IV	2.2	ACRE	4	1	ACRE	2	1	ACRE	N/A	N/A	ACRE	4	2	0		
OPEN SPACE																		
Open Space - Wooded/ Mixed Areas	No	III	168	ACRE	14	1	ACRE	12	1	ACRE	0	1	ACRE	118	101	0		
Open Space - Conifer Stands	No	IV	21	ACRE	0	1	ACRE	0	1	ACRE	80	1	ACRE	0	0	168		
Open Space - Unprogrammed	No	IV	81	ACRE	3	1	ACRE	3	1	ACRE	3	1	ACRE	49	49	49		
Open Space - Programmed	Yes	III	9	ACRE	16	1	ACRE	8	1	ACRE	10	1	ACRE	72	36	45		
REDEVELOPMENT																		
Redevelopment - Future Events Center	No	III	1.5	ACRE	16	1	ACRE	20	1	ACRE	10	1	ACRE	24	30	15		
Redevelopment - Future Features	No	IV	24	ACRE	6	1	ACRE	4	1	ACRE	2	1	ACRE	144	96	48		
SHORELINES																		
Shorelines - Boat Launches/ Beaches/ Fishing	No	III	3	ACRE	4	1	ACRE	0	N/A	N/A	0	N/A	N/A	12	0	0		
OTHER																		
Other/ Specialty - TBD																		
FORT STEVENSON STATE PARK TOTAL TREE COUNT													1757	1023	987			

¹ CATEGORY TYPOLOGY GRAPHIC REPRESENTS HIGH-LEVEL CONCEPTS FOR PLANTINGS AT NORTH DAKOTA STATE PARK FACILITIES FOR CERTAIN CATEGORIES AS INDICATED.

² TIER LEVELS - I=(HIGHER PRIORITY), II, III, IV=(LOWER PRIORITY), FOR TREE PLANTINGS

³ CATEGORY AREAS FOR 586-ACRE STATE PARK AREA

⁴ PROJECTED TREE PLANTING NEEDS NEXT 5 TO 10 YEARS

FORT STEVENSON STATE PARK TREE COUNT SUMMARY TABLE

TREE TYPE	TREE COUNTS PER TIER PRIORITY				TOTAL TREE COUNTS
	I	II	III	IV	
CANOPY/ LARGE TREES	903	335	260	259	1757
UNDERSTORY/ SMALL TREES	533	104	177	209	1023
CONIFER TREES	307	62	93	525	987

Individual Park planting cost estimates are easily extrapolated from the Landscape Matrix database. For this project we are looking at three-year plant cost estimates in Tier I Priority areas (campgrounds, visitor centers, activity centers, concessions, and marina approach areas). Below are examples of Individual Park planting cost estimates.

GRAHAM'S ISLAND STATE PARK PLANTING COST ESTIMATE: TIER I PRIORITY					
ITEM	QUANTITY	UNIT	UNIT COST	SUBTOTAL COST	
PLANTS					
CANOPY TREES	300	EACH	\$225		\$67,500
UNDERSTORY TREES	30	EACH	\$170		\$5,100
CONIFER TREES	50	EACH	\$240		\$12,000
SHRUBS	20	EACH	\$80		\$1,600
PLANT ACCESSORIES					
TUBES/ STAKES	210	TREE	\$60		\$12,600
FENCING (DEER PROTECTION)	140	TREE	\$100		\$14,000
MATERIALS					
MULCH	138	CUBIC YARD	\$120		\$16,560
CONTRACTOR SERVICES					
PLANT FURNISHING, TRANSPORT & INSTALLATION	1	LUMP SUM	\$103,400		\$103,400
MAINTENANCE					
3-YEAR PLANT ESTABLISHMENT	3	YEAR	\$11,000		\$33,000
TIER I TOTAL COST - GRAHAM'S ISLAND STATE PARK					\$265,760

GRAHAMMS ISLAND STATE PARK PLANTING COST ESTIMATE: TIER I & II PRIORITY

ITEM	QUANTITY	UNIT	UNIT COST	SUBTOTAL COST
PLANTS				
CANOPY TREES	666	EACH	\$225	\$149,850
UNDERSTORY TREES	104	EACH	\$170	\$17,680
CONIFER TREES	254	EACH	\$240	\$60,960
SHRUBS	69	EACH	\$90	\$6,210
PLANT ACCESSORIES				
TUBES/ STAKES	510	TREE	\$60	\$30,600
FENCING (DEER PROTECTION)	430	TREE	\$100	\$43,000
MATERIALS				
MULCH	378	CUBIC YARD	\$120	\$45,360
CONTRACTOR SERVICES				
PLANT FURNISHING, TRANSPORT & INSTALLATION	1	LUMP SUM	\$281,600	\$281,600
MAINTENANCE				
3-YEAR PLANT ESTABLISHMENT	3	YEAR	\$30,000	\$90,000
TIER I & II TOTAL COST - GRAHAMMS ISLAND STATE PARK				\$725,260

GRAHAMMS ISLAND STATE PARK PLANTING COST ESTIMATE: TIER III & IV PRIORITY¹

ITEM	QUANTITY	UNIT	UNIT COST	SUBTOTAL COST
PLANTS				
CANOPY TREES	271	EACH	\$208	\$56,233
UNDERSTORY TREES	74	EACH	\$170	\$12,580
CONIFER TREES	26	EACH	\$240	\$6,240
SHRUBS	50	EACH	\$90	\$4,500
PLANT ACCESSORIES				
TUBES/ STAKES	210	TREE	\$60	\$12,600
FENCING (DEER PROTECTION)	120	TREE	\$100	\$12,000
MATERIALS				
MULCH	145	CUBIC YARD	\$120	\$17,400
CONTRACTOR SERVICES				
PLANT FURNISHING, TRANSPORT & INSTALLATION	1	LUMP SUM	\$95,500	\$95,500
MAINTENANCE				
3-YEAR PLANT ESTABLISHMENT	3	YEAR	\$11,000	\$33,000
TIER III & IV TOTAL COST - GRAHAMMS ISLAND STATE PARK				\$250,033

LAKE SAKAKAWEA STATE PARK PLANTING COST ESTIMATE: TIER I PRIORITY

ITEM	QUANTITY	UNIT	UNIT COST	SUBTOTAL COST
PLANTS				
CANOPY TREES	495	EACH	\$225	\$111,375
UNDERSTORY TREES	122	EACH	\$170	\$20,740
CONIFER TREES	90	EACH	\$240	\$21,600
SHRUBS	170	EACH	\$80	\$13,600
PLANT ACCESSORIES				
TUBES/STAKES	390	TREE	\$60	\$23,400
FENCING (DEER PROTECTION)	260	TREE	\$100	\$26,000
MATERIALS				
MULCH	303	CUBIC YARD	\$120	\$36,360
CONTRACTOR SERVICES				
PLANT FURNISHING, TRANSPORT & INSTALLATION	1	LUMP SUM	\$97,794	\$97,794
MAINTENANCE				
3-YEAR PLANT ESTABLISHMENT	3	YEAR	\$19,733	\$59,198
TIER I TOTAL COST - LAKE SAKAKAWEA STATE PARK				\$410,067

LAKE SAKAKAWEA STATE PARK PLANTING COST ESTIMATE: TIER I & II PRIORITY

ITEM	QUANTITY	UNIT	UNIT COST	SUBTOTAL COST
PLANTS				
CANOPY TREES	861	EACH	\$225	\$193,725
UNDERSTORY TREES	147	EACH	\$170	\$24,990
CONIFER TREES	294	EACH	\$240	\$70,560
SHRUBS	98	EACH	\$90	\$8,820
PLANT ACCESSORIES				
TUBES/ STAKES	660	TREE	\$60	\$39,600
FENCING (DEER PROTECTION)	540	TREE	\$100	\$54,000
MATERIALS				
MULCH	484	CUBIC YARD	\$120	\$58,080
CONTRACTOR SERVICES				
PLANT FURNISHING, TRANSPORT & INSTALLATION	1	LUMP SUM	\$357,700	\$357,700
MAINTENANCE				
3-YEAR PLANT ESTABLISHMENT	3	YEAR	\$30,000	\$90,000
TIER I & II TOTAL COST - STATE PARK				\$897,475

PLANTING COST ESTIMATE: TIER III & IV PRIORITY¹

ITEM	QUANTITY	UNIT	UNIT COST	SUBTOTAL COST
PLANTS				
CANOPY TREES	271	EACH	\$208	\$56,233
UNDERSTORY TREES	74	EACH	\$170	\$12,580
CONIFER TREES	26	EACH	\$240	\$6,240
SHRUBS	50	EACH	\$90	\$4,500
PLANT ACCESSORIES				
TUBES/ STAKES	210	TREE	\$60	\$12,600
FENCING (DEER PROTECTION)	120	TREE	\$100	\$12,000
MATERIALS				
MULCH	145	CUBIC YARD	\$120	\$17,400
CONTRACTOR SERVICES				
PLANT FURNISHING, TRANSPORT & INSTALLATION	1	LUMP SUM	\$95,500	\$95,500
MAINTENANCE				
3-YEAR PLANT ESTABLISHMENT	3	YEAR	\$11,000	\$33,000
TIER III & IV TOTAL COST - GRAHAM'S ISLAND STATE PARK				\$250,053

FORT STEVENSON STATE PARK PLANTING COST ESTIMATE: TIER I PRIORITY

ITEM	QUANTITY	UNIT	UNIT COST	SUBTOTAL COST
PLANTS				
CANOPY TREES	515	EACH	\$225	\$115,875
UNDERSTORY TREES	170	EACH	\$170	\$28,900
CONIFER TREES	98	EACH	\$240	\$23,520
SHRUBS	175	EACH	\$80	\$14,000
PLANT ACCESSORIES				
TUBES/ STAKES	430	TREE	\$60	\$25,800
FENCING (DEER PROTECTION)	280	TREE	\$100	\$28,000
MATERIALS				
MULCH	331	CUBIC YARD	\$120	\$39,720
CONTRACTOR SERVICES				
PLANT FURNISHING, TRANSPORT & INSTALLATION	1	LUMP SUM	\$106,827	\$106,827
MAINTENANCE				
3-YEAR PLANT ESTABLISHMENT	3	YEAR	\$21,555	\$64,665
TIER I TOTAL COST - FORT STEVENSON STATE PARK				\$447,307

FORT STEVENSON STATE PARK PLANTING COST ESTIMATE: TIER I & II PRIORITY

ITEM	QUANTITY	UNIT	UNIT COST	SUBTOTAL COST
PLANTS				
CANOPY TREES	881	EACH	\$225	\$198,225
UNDERSTORY TREES	176	EACH	\$170	\$29,920
CONIFER TREES	302	EACH	\$240	\$72,480
SHRUBS	117	EACH	\$90	\$10,530
PLANT ACCESSORIES				
TUBES/ STAKES	690	TREE	\$60	\$41,400
FENCING (DEER PROTECTION)	560	TREE	\$100	\$56,000
MATERIALS				
MULCH	510	CUBIC YARD	\$120	\$61,200
CONTRACTOR SERVICES				
PLANT FURNISHING, TRANSPORT & INSTALLATION	1	LUMP SUM	\$373,400	\$373,400
MAINTENANCE				
3-YEAR PLANT ESTABLISHMENT	3	YEAR	\$30,000	\$90,000
TIER I & II TOTAL COST - GRAHAM'S ISLAND STATE PARK				\$933,155

PLANTING COST ESTIMATE: TIER III & IV PRIORITY¹

ITEM	QUANTITY	UNIT	UNIT COST	SUBTOTAL COST
PLANTS				
CANOPY TREES	271	EACH	\$208	\$56,233
UNDERSTORY TREES	74	EACH	\$170	\$12,580
CONIFER TREES	26	EACH	\$240	\$6,240
SHRUBS	50	EACH	\$90	\$4,500
PLANT ACCESSORIES				
TUBES/ STAKES	210	TREE	\$60	\$12,600
FENCING (DEER PROTECTION)	120	TREE	\$100	\$12,000
MATERIALS				
MULCH	145	CUBIC YARD	\$120	\$17,400
CONTRACTOR SERVICES				
PLANT FURNISHING, TRANSPORT & INSTALLATION	1	LUMP SUM	\$95,500	\$95,500
MAINTENANCE				
3-YEAR PLANT ESTABLISHMENT	3	YEAR	\$11,000	\$33,000
TIER III & IV TOTAL COST -				\$250,053

The landscape matrix database will guide allocation of resources for future tree and shrub planting efforts within state parks, facilitate strategic decision-making, maximize tree planting program outcomes, and promote sustainable management practices. In addition to the database, landscape template infographics includes category planting goals, suggested canopy, understory and conifer trees and shrubs, and a visual representation of ideal planting layouts.

CATEGORY:
BUILT ENVIRONMENT:

Subcategory:

- ◆ Entry/Visitors/Activity Centers
- ◆ Cabins
- ◆ Amphitheaters

TREE PLANTING GOALS:

- Park grade trees
- Shade near buildings & amenities
- Shade in parking lots
- Welcoming to visitors
- Showcase local plants

CATEGORY EXAMPLE IMAGES:




Image: Fort Stevenson State Park amphitheater




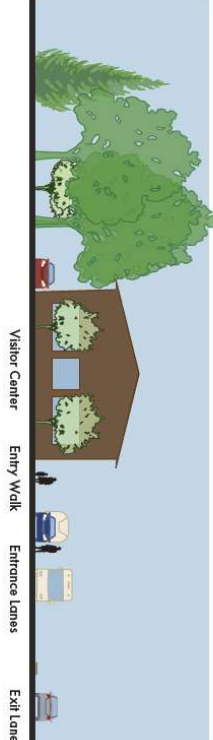
Image: Fort Stevenson State Park parking

North Dakota Parks & Recreation Department

LANDSCAPE MATRIX

Landscape Matrix sheets are intended as representations of Category layouts, not as planting plans.

TYPOLOGY:



Visitor Center Entry Walk Entrance Lanes Exit Lane

CANOPY/ LARGE TREES

Red Maple
Hickberry
Ironwood
Balsam Poplar
Cottonwood
Quaking Aspen
Bur Oak
American Linden
American Elm

May 1, 2024

Princeton

Acer rubrum
Celtis occidentalis
Castro virginiana
Populus balsamifera
Populus deltoides
Populus tremuloides
Quercus macrocarpa
Tilia americana
Ulmus americana
Prinria Exhibition

UNDERSTORY/ SMALL TREES

Chokeberry
Pin Cherry
Peach-Leaf Willow

Prunus virginiana
Prunus pennsylvanica
Salix amygdaloides

SMALL TREES/ LARGE SHRUBS

Juneberry
Red Osier Dogwood
Howlhorn
Silverberry
Tall Cinquefoil
Sand Cherry
Smooth Sumac
American Currant
Wild Prairie Rose
Silver Buffaloberry
Nannyberry

Amelanchier alnifolia
Cornus sericea
Cotonegus rostrata
Elaeagnus communita
Potentilla arguta
Prunus besseyi
Rhus glabra
Ribes americanum
Rosa arkansana
Shepherdia argentea
Viburnum lentago

CONIFERS

Rocky Mountain Juniper
Black Hills Spruce
Colorado Blue Spruce
Ponderosa Pine

Juniperus scopulorum
Picea glauca var. *denota*
Picea pungens
Pinus ponderosa

* Other landscape plant massings such as small shrubs, perennials and grasses recommended for pedestrian focused areas for circulation and aesthetics.

* Plant species listed above are generally representative and will vary regionally. See state park planting approved lists.

LANDSCAPE MATRIX

TPOLOGY:

Landscape Matrix sheets are intended as representations of Category layouts, not as planting plans.

May 1, 2024

CATEGORY:
BUILT ENVIRONMENT:

Subcategory:

- ◆ Entry/Visitors/Activity Centers
- ◆ **Cabins**
- ◆ Amphitheaters

TREE PLANTING GOALS:

- Park grade trees
- Shade near buildings & amenities
- Shade in parking lots
- Appealing in all seasons
- Buffer between uses

CATEGORY EXAMPLE IMAGES:

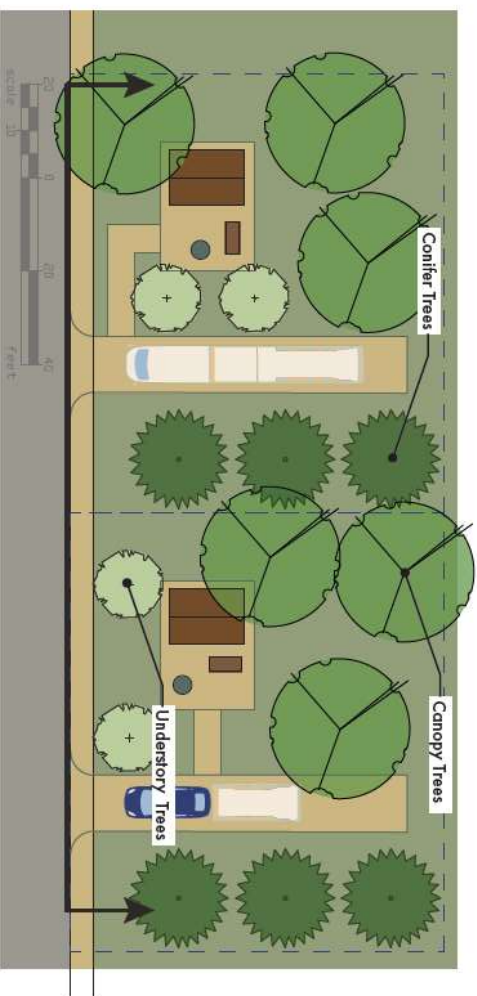
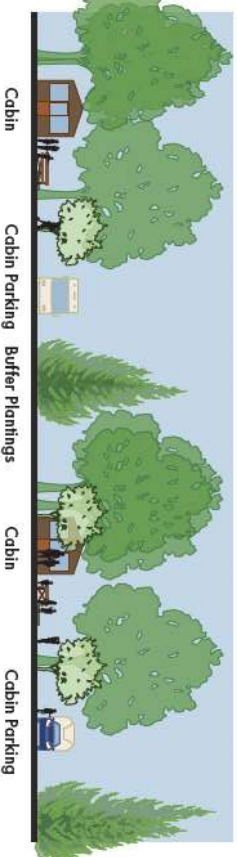


Image: Fort Stevenson State Park marina



Image: Fort Stevenson State Park amphitheater

North Dakota Parks & Recreation Department



CANOPY / LARGE TREES

- | | |
|-----------------|----------------------|
| Red Maple | Acer rubrum |
| Hackberry | Celtis occidentalis |
| Ironwood | Osrya virginiana |
| Balsam Poplar | Populus balsamifera |
| Cottonwood | Populus deltoides |
| Quaking Aspen | Populus tremuloides |
| Bur Oak | Quercus macrocarpa |
| American Linden | Tilia americana |
| American Elm | Ulmus americana |
| | 'Prairie Exhibition' |
| | 'Princeton' |

UNDERSTORY / SMALL TREES

- | | |
|-------------------|----------------------|
| Chokecherry | Prunus virginiana |
| Pin Cherry | Prunus pennsylvanica |
| Peach-leaf Willow | Salix amygdaloides |

SMALL TREES / LARGE SHRUBS

- | | |
|---------------------|------------------------|
| Juneberry | Amelanchier alnifolia |
| Red Osier Dogwood | Cornus sericea |
| Hawthorn | Crataegus rotundifolia |
| Silverberry | Elaeagnus commutata |
| Tall Cinquefoil | Potentilla arguta |
| Sand Cherry | Prunus besseyi |
| Smooth Sumac | Rhus glabra |
| American Currant | Ribes americanum |
| Wild Prairie Rose | Rosa arkansana |
| Silver Buffaloberry | Shepherdia argentea |
| Nannyberry | Viburnum lentago |

CONIFERS

- | | |
|------------------------|---------------------------|
| Rocky Mountain Juniper | Juniperus scopulorum |
| Black Hills Spruce | Picea glauca var. densata |
| Colorado Blue Spruce | Picea pungens |
| Ponderosa Pine | Pinus ponderosa |

* Other landscape plant massings such as small shrubs, perennials and grasses recommended for pedestrian focused areas for circulation and aesthetics.

* Plant species listed above are generally representative and will vary regionally. See state park planting approved lists.

LANDSCAPE MATRIX

TYPOLOGY:

Landscape Matrix sheets are intended as representations of Category layouts, not as planting plans.

CATEGORY:
CAMPGROUND

Subcategory:

- ◆ **Dense Camping Sites**
- ◆ **Dispersed Camping Sites**
- ◆ **Primitive Camping Sites**

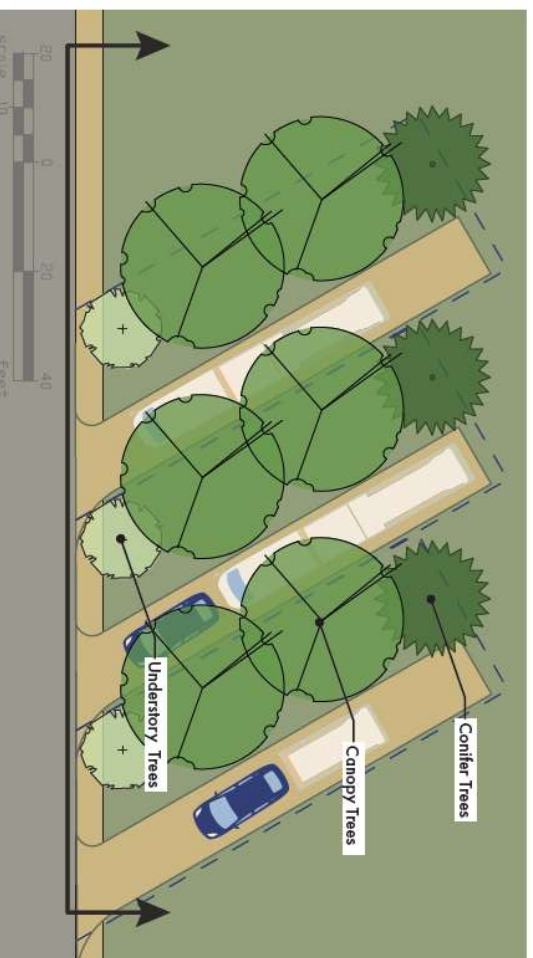
TREE PLANTING GOALS:

- Replacement of declining trees
- Shade
- Screening

CATEGORY EXAMPLE IMAGES:



North Dakota Parks & Recreation Department



- CANOPY / LARGE TREES**
- | | |
|-----------------|----------------------------|
| Red Maple | <i>Acer rubrum</i> |
| Hackberry | <i>Celtis occidentalis</i> |
| Ironwood | <i>Ostrya virginiana</i> |
| Balsam Poplar | <i>Populus balsamifera</i> |
| Cottonwood | <i>Populus deltoides</i> |
| Quaking Aspen | <i>Populus tremuloides</i> |
| Bur Oak | <i>Quercus macrocarpa</i> |
| American Linden | <i>Tilia americana</i> |
| American Elm | <i>Ulmus americana</i> |

- UNDERSTORY / SMALL TREES**
- | | |
|-------------------|-----------------------------|
| Chokecherry | <i>Prunella virginiana</i> |
| Pin Cherry | <i>Prunus pennsylvanica</i> |
| Peach-Leaf Willow | <i>Salix amygdaloides</i> |

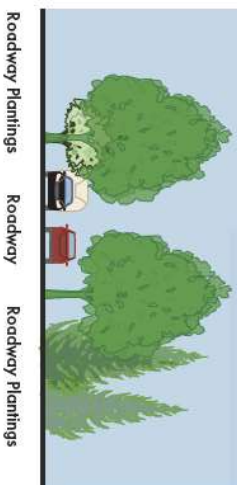
- SMALL TREES / LARGE SHRUBS**
- | | |
|---------------------|------------------------------|
| Juneberry | <i>Amelanchier alnifolia</i> |
| Red Osier Dogwood | <i>Cornus sericea</i> |
| Hawthorn | <i>Cornus rostrata</i> |
| Silverberry | <i>Elaeagnus commutata</i> |
| Tall Chokecherry | <i>Potentilla arguta</i> |
| Sand Cherry | <i>Prunus besseyi</i> |
| Smooth Sumac | <i>Rhus glabra</i> |
| American Currant | <i>Ribes americanum</i> |
| Wild Prairie Rose | <i>Rosa arkansana</i> |
| Silver Buffaloberry | <i>Shepherdia argentea</i> |
| Nannyberry | <i>Viburnum lentago</i> |

- CONIFERS**
- | | |
|------------------------|---|
| Rocky Mountain Juniper | <i>Juniperus scopulorum</i> |
| Black Hills Spruce | <i>Picea glauca</i> var. <i>densata</i> |
| Colorado Blue Spruce | <i>Picea pungens</i> |
| Ponderosa Pine | <i>Pinus ponderosa</i> |
- * Other landscape plant massings such as small shrubs, perennials and grasses recommended for pedestrian focused areas for circulation and aesthetics.
- * Plant species listed above are generally representative and will vary regionally. See state park planting approved lists.

LANDSCAPE MATRIX

TYPOLGY:

Landscape Matrix sheets are intended as representations of Category layouts, not as planting plans.



CATEGORY:
CORRIDORS

Subcategory:

- ◆ Roadways
- ◆ Trails - summer & winter

TREE PLANTING GOALS:

- Experiential & aesthetic quality
- Define circulation
- Provide shade/ respites
- Screening
- Windbreak

CATEGORY EXAMPLE IMAGES:

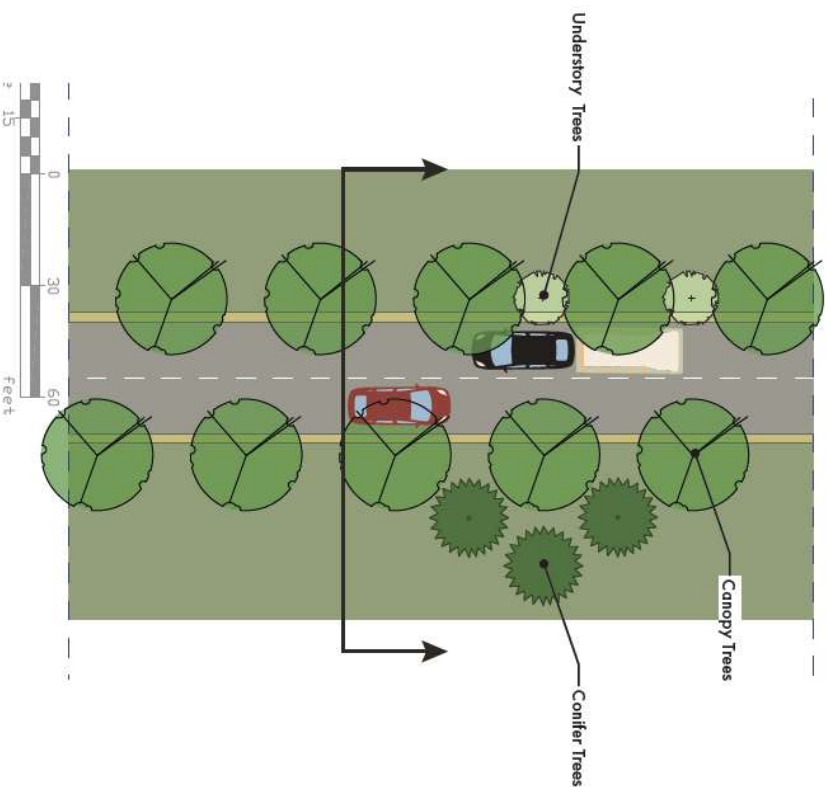


Image: Lake Sakakawea State Park entry road



Image: Fort Stevenson State Park trail

North Dakota Parks & Recreation Department



May 1, 2024

CANOPY / LARGE TREES

- | | |
|-----------------|-----------------|
| Acer rubrum | Red Maple |
| Hackberry | Hackberry |
| Ironwood | Ironwood |
| Balsam Poplar | Balsam Poplar |
| Cottonwood | Cottonwood |
| Quaking Aspen | Quaking Aspen |
| Bur Oak | Bur Oak |
| American Linden | American Linden |
| American Elm | American Elm |

UNDERSTORY / SMALL TREES

- | | |
|-------------------|---------------------|
| Chokecherry | Prunus virginiana |
| Pin Cherry | Prunus pensylvanica |
| Peach-Leaf Willow | Salix amygdaloides |

SMALL TREES / LARGE SHRUBS

- | | |
|---------------------|------------------------|
| Juneberry | Amelanchier alnifolia |
| Red Osier Dogwood | Cornus sericea |
| Hawthorn | Crataegus rotundifolia |
| Silverberry | Elaeagnus communita |
| Tall Cinqfoil | Potentilla arguta |
| Sand Cherry | Prunus besseyi |
| Smooth Sumac | Rhus glabra |
| American Currant | Ribes americanum |
| Wild Prairie Rose | Rosa arkansana |
| Silver Buffaloberry | Shepherdia argentea |
| Nannyberry | Viburnum lentago |

CONIFERS

- | | |
|------------------------|---------------------------|
| Rocky Mountain Juniper | Juniperus scopulorum |
| Black Hills Spruce | Picea glauca var. densata |
| Colorado Blue Spruce | Picea pungens |
| Ponderosa Pine | Pinus ponderosa |

* Other landscape plant massings such as small shrubs, perennials and grasses recommended for pedestrian focused areas for circulation and aesthetics.

* Plant species listed above are generally representative and will vary regionally. See state park planting approved lists.

LANDSCAPE MATRIX

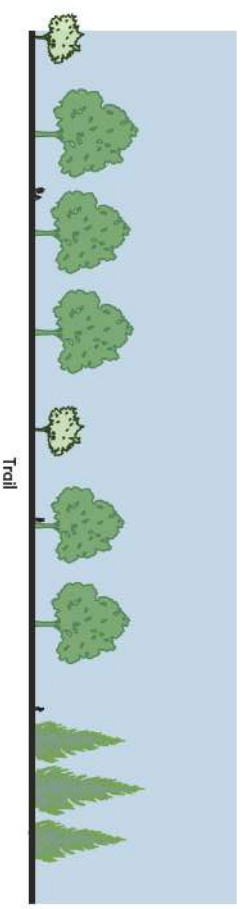
TYPOLGY:

Landscape Matrix sheets are intended as representations of Category layouts, not as planting plans.

CATEGORY:
CORRIDORS

Subcategory:

- ◆ Roadways
- ◆ Trails - summer & winter



TREE PLANTING GOALS:

- Experiential & aesthetic quality
- Define circulation
- Provide shade/respite
- Screening
- Windbreak

CATEGORY EXAMPLE IMAGES:

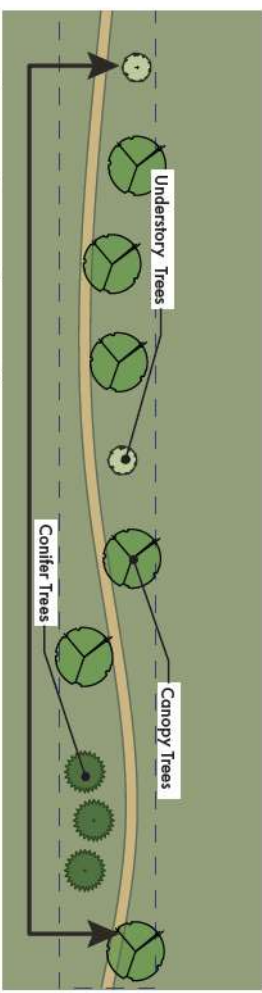


Image: Lake Sakakawea State Park entry road



Image: Fort Stevenson State Park trail

North Dakota Parks & Recreation Department



CANOPY / LARGE TREES

Red Maple	<i>Acer rubrum</i>
Hackberry	<i>Celtis occidentalis</i>
Ironwood	<i>Ostrya virginiana</i>
Balsam Poplar	<i>Populus balsamifera</i>
Cottonwood	<i>Populus deltoides</i>
Quaking Aspen	<i>Populus tremuloides</i>
Bur Oak	<i>Quercus macrocarpa</i>
American Linden	<i>Tilia americana</i>
American Elm	<i>Ulmus americana</i>

UNDERSTORY / SMALL TREES

Chokecherry	<i>Prunus virginiana</i>
Pin Cherry	<i>Prunus pennsylvanica</i>
Peach-Leaf Willow	<i>Salix amygdaloides</i>

SMALL TREES / LARGE SHRUBS

Juneberry	<i>Amelanchier alnifolia</i>
Red Osier Dogwood	<i>Cornus sericea</i>
Hawthorn	<i>Crataegus rotundifolia</i>
Silverberry	<i>Elaeagnus commutata</i>
Tall Cinquefoil	<i>Potentilla arguta</i>
Sand Cherry	<i>Prunus besseyi</i>
Smooth Sumac	<i>Rhus glabra</i>
American Currant	<i>Ribes americanum</i>
Wild Prairie Rose	<i>Rosa arkansana</i>
Silver Buffaloberry	<i>Shepherdia argentea</i>
Nannyberry	<i>Viburnum lentago</i>

CONIFERS

Rocky Mountain Juniper	<i>Juniperus scopulorum</i>
Black Hills Spruce	<i>Picea glauca</i> var. <i>densata</i>
Colorado Blue Spruce	<i>Picea pungens</i>
Ponderosa Pine	<i>Pinus ponderosa</i>

* Other landscape plant massings such as small shrubs, perennials and grasses recommended for pedestrian focused areas for circulation and aesthetics.
* Plant species listed above are generally representative and will vary regionally. See state park planting approved lists.

NORTH DAKOTA STATE PARKS		ESTIMATED PARK USE AREA (ACRES)	SETTING/ GEOMORPHOLOGY	TIER I PRIORITY - WITHIN 5 YEARS		TIER II, III & IV PRIORITY - PROJECTED BEYOND 5 YEARS				
PROJECTED PLANTING COSTS				COMPARABLE PLANTING COST RATE (COST/ACRE) W/IN 5 YEARS	PERCENT APPLICABLE	APPLICABLE PLANTING COST RATE (COST/ACRE) W/IN 5 YEARS	PROJECTED PLANTING COSTS (W/IN 5 YEARS)	COMPARABLE PLANTING COST RATE (COST/ACRE) FOR 5+ YEARS	PERCENT APPLICABLE	APPLICABLE PLANTING COST RATE (COST/ACRE) 5+ YEARS
BEAVER LAKE STATE PARK	283	Lakeside, rolling hillsides, Beaver Lake	\$1,818	25%	\$455	\$128,624	\$2,200	100%	\$2,200	\$622,600
CROSS RANCH STATE PARK	420	River bank corridor, Missouri River	\$455	75%	\$341	\$143,325	\$1,234	100%	\$1,234	\$518,280
FORT ABRAHAMLINCOLN STATE PARK	600	Missouri River corridor, river bottoms	\$455	75%	\$341	\$204,250	\$1,234	100%	\$1,234	\$740,400
FORT RANSOM STATE PARK	385	Shayenne River corridor, meandering, dendritic drainage pattern, rolling topo	\$455	75%	\$341	\$131,381	\$1,234	100%	\$1,234	\$475,090
ICELANDIC STATE PARK	403	Lakeside, rolling hillsides, Lake Renwick	\$455	75%	\$341	\$137,524	\$1,234	100%	\$1,234	\$497,302
LAKE METIGOSHE STATE PARK	350	Plateau, at 2000 ft msl, Lake Metigoshe, School Section Lake	\$455	75%	\$341	\$119,438	\$1,234	100%	\$1,234	\$431,900
LEWIS & CLARK STATE PARK	410	Lakeside, small bluffs, Lake Sakakawea	\$1,818	75%	\$1,364	\$559,035	\$2,745	100%	\$2,745	\$1,125,450
LITTLE MISSOURI STATE PARK	20	Badlands, dendritic drainageways extending to Little Missouri River	\$1,953	75%	\$1,465	\$29,295	\$2,745	100%	\$2,745	\$54,900
SULLY CREEK STATE PARK	63	Badlands, buttes, rolling hillsides, river bank, Little Missouri River	\$1,953	50%	\$977	\$61,520	\$2,745	100%	\$2,745	\$172,935
TURTLE RIVER STATE PARK	585	Meandering river corridor, river bottoms, rolling topo, oxbows, Turtle River	\$455	75%	\$341	\$199,631	\$1,234	100%	\$1,234	\$721,890
LANDSCAPE MATRIX PARKS										
FORT STEVENSON STATE PARK	586	Gently rolling, lakeside (river dam), small bluff shorelines edge, Lake Sakakawea	\$1,818	75%	\$1,364	\$759,011	\$2,200	100%	\$2,200	\$1,289,200
GRAHAMNS ISLAND STATE PARK	575	Large lake setting, island, gently rolling, Devils Lake	\$455	75%	\$341	\$196,219	\$1,234	100%	\$1,234	\$709,550
LAKE SAKAKAWEA STATE PARK	500	Lakeside (river dam), flat, open topography, small bluff shorelines edge, Lake Sakakawea	\$1,953	75%	\$1,465	\$732,375	\$2,745	100%	\$2,745	\$1,372,500
TOTAL PROJECT PLANTING COSTS FOR ALL STATE PARKS						\$3,442,127				\$8,731,997

By following this comprehensive tree planting strategy and tailoring the plan to park specific goals and context, North Dakota Parks and Recreation can create a strategic tree planting plan that maximizes environmental benefits, community engagement, and long-term sustainability.