U.S. Department of Agriculture Forest Service

Comprehensive Capital Improvement Plan

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ABBREVIATIONS

AMRB	Asset Management Review Board
AOP	Aquatic Organism Passage
AV	Asset Value
BLI	Budget Line Item
BLM	Bureau of Land Management
BTU	British Thermal Unit
CCIP	Comprehensive Capital Improvement Plan
CIM	Capital Improvement and Maintenance
CMFC	Budget Line Item for Facilities
CMRD	Budget Line Item for Transportation System Infrastructure
CMTL	Budget Line Item for Trails and Trail Bridges
CRV	Current Replacement Value
DOI	U.S. Department of the Interior
DOT	Department of Transportation
ELT	Executive Leadership Team
ERFO	Emergency Relief for Federally Owned Roads
ESPC	Energy Savings Performance Contract
FAST Act	Fixing America's Surface Transportation Act
FLAP	Federal Lands Access Program
FLTP	Federal Lands Transportation Program
FMCP09	Cost Pool 09
FRPP	Federal Real Property Profile
FS	Forest Service
FY	Fiscal Year
HVAC	Heating, Ventilation, and Air Conditioning
IAM	Institute of Asset Management
MADA	Multiattribute Decision Analysis

MAP-21	Moving Ahead for Progress in the 21st Century Act
NEPA	National Environmental Policy Act
NFS	National Forest System
NFSR	National Forest System Roads
NPS	National Park Service
NRC	National Research Council
OIG	Office of Inspector General
OMB	Office of Management and Budget
PMI	Project Management Institute
R&D	Research and Development
SDWA	Safe Drinking Water Act
SHPO	State Historic Preservation Office
SOP	Standard Operating Procedure
SPBA	Strategic Planning, Budget and Accountability Performance
USD	U.S. Dollars
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
WCF	Working Capital Fund
WO	Washington Office

1 INTRODUCTION

The U.S. Department of Agriculture (USDA) Forest Service (FS or the "Agency") manages 154 national forests and 20 national grasslands. These areas, collectively known as the National Forest System (NFS), combine to cover an area nearly twice the size of California, encompassing 193 million acres in 43 states, the U.S. Virgin Islands, and Puerto Rico.[1,2] NFS lands include specially designated wilderness areas, wild and scenic rivers, national monuments, research and experimental areas, and other unique natural and cultural treasures. The FS's mission is to sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations.[2] To guide FS in support of its mission, the FS chief has established the following focus areas:

1. Uplifting and empowering employees through a respectful, safe working environment.
2. Being good neighbors and providing excellent customer service.
3. Promoting shared stewardship by increasing partnerships and volunteerism.
4. Improving the conditions of forests and grasslands.
5. Enhancing recreational opportunities, improving access, and sustaining infrastructure.

To achieve this mission and align with the FS chief's focus areas, FS operates and maintains an extensive infrastructure portfolio that includes buildings, fire and aviation assets, dams, recreation sites, wastewater systems, drinking water systems, roads, road bridges, trails, trail bridges, and administrative assets. Because these assets are critical for mission success, FS created a set of national infrastructure goals to guide the Agency's investment decisions. These infrastructure-specific goals mirror many aspects of the FS chief's focus areas, ensuring that infrastructure investment priorities align with the Agency's priorities.[3] The goals also support the Agency's strategic plan for fiscal year (FY) 2015 to FY 2020, which states that FS will manage facilities for safety, accessibility, efficiency, and cost effectiveness, while also striving to reduce its environmental footprint by using wood and other sustainable materials and improving energy efficiency in building construction and reconstruction practices.[4]

FS has developed a long-term, sustainable, comprehensive capital improvement plan (CCIP) to manage its assets effectively and achieve its infrastructure goals. This report outlines a strategic framework to address the Agency's challenges and evolving priorities; asset portfolio; approach to CCIP development; and proposed selection process for construction, maintenance, and decommissioning projects. This framework will position FS to implement a multiyear CCIP that ensures effective stewardship of NFS lands and honors its fiduciary responsibility to wisely spend the funding it receives.

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[1] USDA Forest Service Website. (2013, November). By the Numbers.
[2] USDA Forest Service Website. (n.d.). About the Agency.
[3] The FS national infrastructure goals are: (1) Deliver community benefits and customer service to the public; (2) provide forest access that supports recreation, natural resource management, emergency response, community benefit, and administration of NFS lands; (3) provide a portfolio of assets operated and maintained in a socially, ecologically, and economically sustainable manner; and (4) establish and leverage partnerships to achieve mutual understanding, coordinate efforts, and use resources and funds efficiently.
[4] USDA Forest Service. (2015). *USDA Forest Service Strategic Plan: FY 2015–2020* (Rep. No. FS-1045).

2 FOREST SERVICE BACKGROUND

The Agency's primary mission is to sustain the health, diversity, and productivity of NFS lands to meet the needs of present and future generations. Infrastructure managed by the Agency enables the public to enjoy the NFS's many recreational and sightseeing opportunities, as well as provides the Federal Government with access to conduct forest research and economic activities such as mineral extraction, timber harvesting, and energy production (i.e., wind, solar, coal, geothermal, and oil and gas). As the demand for access to NFS lands grows, it is imperative to continue managing and conserving their rich endowment of natural resources.

The Agency is home to the world's largest forestry research organization, comprising seven research stations and more than 80 experimental forests and ranges.[5] FS's research and development (R&D) team develops innovative technologies, tools, and processes that benefit the public and the environment. In fact, management processes developed by FS R&D have improved the quality and reduced the cost of drinking water provided by NFS lands to more than 66 million Americans in 3,400 communities.[6] Furthermore, wildfire research conducted by FS R&D has led to the development of innovative firefighting technologies that mitigate the harmful effects of wildfire smoke and, as of 2013, enable the suppression of 98 percent of forest fires within the first 24 hours.[1,7]

In addition to R&D breakthroughs, NFS lands directly support economic and social activities in the United States. In FY 2016, recreational pursuits such as hiking, walking, downhill skiing, scenic appreciation, and wildlife viewing attracted more than 149 million visitors annually,[8] contributed more than $10 billion to the U.S. economy, and sustained more than 143,000 full-time and part-time jobs.[9] In FY 2017, activity on NFS lands contributed $31 billion to the U.S. economy and accounted for more than 340,000 jobs.[10] At the local level, scenic landscapes and recreational activities not only contribute to the tourism industry, but also enhance the quality of life, employment opportunities, and property values of the communities in close proximity to NFS lands. In addition to tourism, NFS lands generate significant economic benefits through fees paid for livestock grazing and similar activities, as well as through resource extraction and restoration.

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[5] USDA Forest Service Website. (2018, August 13) About R&D.
[6] USDA Forest Service Website. (n.d.). Water Facts.
[7] U.S. Department of Agriculture Blog. Riggs, K. (2015, September 8). Wildfire Smoke Monitors Working to Reduce Health and Safety Impacts.
[8] USDA Forest Service Website. (n.d.). Benefits to People - At a Glance.
[9] USDA Forest Service. (2016). *U.S. Forest Service National Visitor Use Monitoring Survey Results National Summary Report 2016.*
[10] USDA Forest Service. (2018). *FY 2019 Congressional Budget Justification.* Washington DC.

3 CAPITAL IMPROVEMENT AND MAINTENANCE CHALLENGES

The Agency receives its funding from Congressional appropriations and external sources such as partnership agreements and donations. Additionally, the Agency generates revenue from services and products it provides to the public, as well fees paid by private industry for use of NFS lands. But aging infrastructure and shifting Agency priorities make the timely maintenance of capital assets a challenge, which often leads to deferred maintenance—"maintenance that was not performed when it should have been or when it was scheduled and which, therefore, was ... delayed."[11]

The risks that deferred maintenance poses to the infrastructure portfolio are significant. "When allowed to accumulate without limits or consideration of useful life, deferred maintenance leads to deterioration of performance, increased costs to repair, and decrease in asset value."[11] Performance impacts due to deferred maintenance generally fall into three broad categories: *effectiveness*, *reliability*, or *cost* of assets.[12] As estimated by the National Research Council (NRC), each $1 in deferred maintenance results in a long-term capital liability of $4 to $5, and an "accumulation of deferred investments over the long term may be significantly greater than the short-term savings that public-sector decision makers were initially seeking."[13] At current funding levels, FS does not have the resources necessary to adequately support the capital improvements, deferred maintenance, and decommissioning needs across its portfolio.

3.1 FUNDING CONDITIONS

3.1.1 Appropriations

Appropriations made by the Subcommittee on Appropriations—Interior, Environment, and Related Agencies are the FS's primary means of capital improvement and maintenance (CIM) funding. As shown in figure 1, between FY 2010 and FY 2014, the Agency's annual funding was reduced by 37 percent before stabilizing in FY 2015 at approximately $360-365 million per year through FY 2018.

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[11] *U.S. Department of the Interior. (1998). Financial Health. In Common Definitions for Maintenance and Construction Terms.*
[12] Federal Facilities Council Standing Committee on Operations and Maintenance. (2001). *Deferred Maintenance Reporting for Federal Facilities: Meeting the Requirements of Federal Accounting Standards Advisory Board Number 6.* Washington, DC: National Academy Press. https://doi.org/10.17226/10095
[13] National Research Council. (2004). *Investments in Federal Facilities: Asset Management Strategies for the 21st Century.* Washington DC: The National Academy Press. https://doi.org/10.17226/11012.
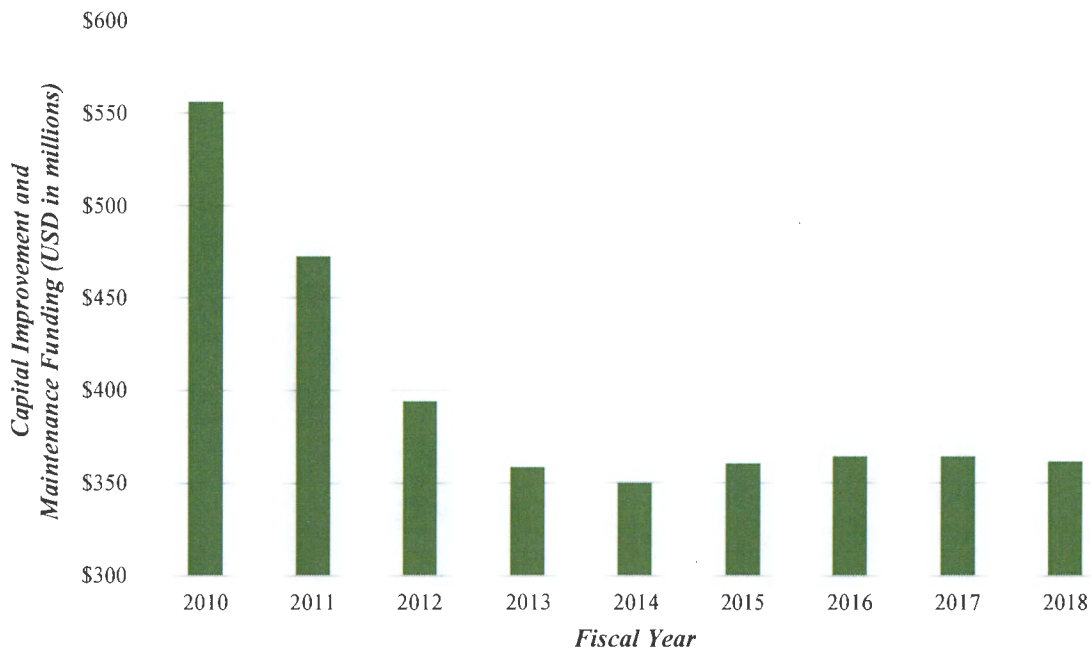
Figure 1: FS Capital Improvement and Maintenance Funding from the Subcommittee on Appropriations—Interior, Environmental, and Related Agencies, FY 2010 – FY 2018.

The Agency's CIM budget must balance short-term needs with long-term priorities. Short-term needs such as deferred maintenance consume a substantial part of the Agency's facilities budget and reduce the funding available for long-term capital improvement projects. Prior to FY 2012, approximately $9 million per year were appropriated to deferred maintenance of facilities. Beginning in FY 2013, due to a reduction in the annual appropriation for facilities from $135 million in 2011 to $76 million in 2012, the Agency began allocating approximately $3 million per year to deferred maintenance—funding levels that represented only 0.05 percent of the FY 2013 deferred maintenance backlog.[14] As of FY 2017, the Agency no longer allocates a dedicated portion of its facilities budget to deferred maintenance, although it must still find the means to pay for deferred maintenance.

FS has prioritized only what poses an immediate health and safety risk within its asset portfolio. This approach inevitably leads to a premature shift away from preventative and deferred maintenance toward new, capital replacement expenditures because so many assets become unsafe, unusable, or irreparable, thus failing their intended designs. In real terms, this approach increases the frequency that recreation sites are closed due to the delay of critical safety repairs, access road closures, and an overall inability to perform frequent required preventative maintenance activities.

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[14] USDA Forest Service. (2012). *FY 2013 Congressional Budget Justification*. Washington DC.

3.1.2 External Sources of Funding

Beginning in FY 2016, FS leveraged USDOT funding under the authority of the Fixing America's Surface Transportation Act ("FAST Act"), which provides funding to FS through the Federal Lands Transportation Program (FLTP). The program allocated $15 million to FS in FY 2016, and this amount will increase by $1 million every year until FY 2020. These funds are used to repair Agency roads, trails, bridges, and transit systems. The FLTP network includes 29,283 miles of roads (i.e., 8 percent of FS roads), 30,767 miles of trails (i.e., 19 percent of FS trails), and 2,431 bridges (i.e., 39 percent of FS bridges).[15]

In addition, the Agency awarded 11 energy savings performance contracts (ESPCs) that require no upfront capital. In ESPCs, contractors incur the costs of implementing energy or water conservation measures, and then they are paid over time for the guaranteed energy, water, and operations and maintenance savings. ESPCs have yielded approximately $20 million in project investment, approximately $32 million in guaranteed utility savings, and reduced energy use by up to 45 billion British thermal units (BTUs) per year. This approach to third-party financed facility improvements has provided modest but highly cost-effective funding.[16]

The Agency plans to continue pursuing third-party financing for energy- and water-related improvement projects to conserve CIM funds for facilities, while improving facility performance. However, the amount of funding available is limited by the number of projects with reasonable payback durations. As such, third-party funding covers only a small portion of overall capital needs.

3.1.3 Additional Funding Proposals

In its FY20 budget justification, the Forest Service proposed three innovative ways to increase the funding available for capital improvement and maintenance projects.

1) **The Roads and Trails Fund**
   Under this fund, 10 percent of all National Forest Fund receipts, which is inclusive of both fees and other types of revenue, are used by the Forest Service without regard to the State in which the amounts were derived, to repair or reconstruct roads, bridges, and trails on National Forest System (NFS) lands. The FY 2020 President's Budget proposes that these funds could be used by the Secretary of Agriculture to repair or reconstruct roads, bridges, and trails on NFS lands rather than deferring them to the Treasury.

2) **Communications Site Administrative Fee Retention**
   The Agriculture Improvement Act, 2018 authorizes the Forest Service to establish, collect, and retain a new administrative fee to cover costs incurred by the Forest Service to manage communication site uses on National Forest System (NFS) lands. The agency seeks authority to retain and spend up to $4.5 million annually in land use fees collected for communication sites on National Forest System lands to better manage the growing use of Forest Service lands for communications facilities. This proposal would allow the Forest Service to better serve its customers, emergency services, and visitors to National Forest System lands by providing expanded telecommunications capabilities, including cellular coverage and broadband access, to rural communities. These expanded capabilities would benefit rural

communities and areas where little or no capability currently exists, enable greater coordination in emergency response situations, and increase overall safety for visitors, agency staff, and first responders.

3) **The Public Lands Infrastructure Fund**
The FY 2020 President's Budget proposes jointly supporting the Department of the Interior (DOI) and USDA, with the Public Lands Infrastructure Fund that would create a $6.5 billion fund over five years to improve and repair facilities at national parks and forests, wildlife refuges, Bureau of Indian Education (BIE) schools, and other public lands. The fund would be supported by the deposit of 50 percent of all federal energy development proceeds that would otherwise be credited or deposited as miscellaneous receipts to the Treasury over the 2020-2024 period, subject to an annual maximum of $1.3 billion.

3.2 AGING INFRASTRUCTURE AND EVOLVING PRIORITIES

Many of the assets the FS relies on today are the same assets that have served the Nation's forests for decades. As funding allocations shift toward other evolving priorities, the continued reliance on aging assets strains the maintenance budget. Since its formation in 1905, FS has used its assets to support its activities in accordance with the sustainable multiple use management concept that dates back to the Organic Act of 1897. This act allowed for the proper care and maintenance of what were then forest reserve lands and mandated that new lands also provide for timber production and watershed protection. As a result, FS has invested in timber, clean water, and watershed protection for more than a century.[18]

Furthermore, throughout its history, FS's capital investment decisions have reflected the national priorities of the time. For example, US timber production grew dramatically during the post-war development period that followed the end of World War II, and this growth lasted through the 1960s. Concurrent with increased timber production, FS opened the Nation's forests to timber development and focused its capital infrastructure investment strategy toward assets that connected private industry to the supply of timber throughout the Nation's forests. In the late 1980s, FS timber harvesting peaked at a rate of more than 12.5 billion board feet per year, then annual production gradually dropped until the late 1990s when the funding to access timber declined.[19] Currently, there is renewed emphasis on timber production. In FY 2018, FS harvested nearly 3.1 billion board feet of timber, its highest annual total since 1999, and more funding is devoted to timber harvesting.[20,19] To support timber production, FS has reprioritized appropriation funds to increase support for assets necessary to realize its timber production goals.

Forest management remains a priority for the Agency as it provides important benefits to forests and the surrounding communities. Strategic timber harvesting can foster resilient, adaptive ecosystems; mitigate climate change; reduce wildfire risk; and strengthen communities. In addition to timber harvesting, FS sells special forest products to the public such as floral greenery, Christmas trees, mushrooms, transplants (i.e., trees, shrubs), medicinal plants, herbs, nuts, berries, and decorative wood.[20]

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[15] USDA Forest Service. (2016). *U.S. Forest Service Investment Strategy for the Federal Lands Transportation Program. FY2016 – FY2020.*
[16] USDA Forest Service Employee Communication with Working Group (November 8, 2018).
[17] USDA Forest Service. (2019). *FY 2020 Congressional Budget Justification.* Washington DC.

[18] Williams., G. W. (2005). *The USDA Forest Service—The First Century.* Washington DC: USDA Forest Service.
[19] *USDA Forest Service Website. (n.d.). FY 1905-2017 National Summary Cut and Sold Data and Graphs.*
[20] USDA Forest Service Internal Data from Washington Office.

Additionally, demand for recreational access to NFS lands expanded after World War II, requiring the Agency to build additional assets for public use and increase the maintenance of high-use assets. In 1957, recognizing this increased demand, the Agency launched "Operation Outdoors," a five-year program aimed at expanding its recreational facility footprint.[18] Many current assets were built more than 60 years ago as part of this initiative; thus, the Agency is stranded with an aging asset portfolio with significant management challenges. On average, road bridges on NFS lands are 50 years old, while 39 percent of buildings, 55 percent of dams, and 13 percent of water systems are more than 50 years old.[21,22]

By virtue of being more than 50 years old, more than 56,000 assets overseen by the Agency qualify for inclusion on the National Register of Historic Places.[23] Changes to assets that are included on, or eligible for, the historic register must be coordinated with State Historic Preservation Offices (SHPOs) and the Advisory Council on Historic Preservation. [24,25] Consequently, additional resources with specialized skill sets are required for even minor, routine maintenance projects on historic infrastructure.

The Agency's infrastructure portfolio is unique among Federal agencies in that it comprises a diverse assemblage of asset types that produce positive externalities enjoyed by the public and business entities. Its assets provide exposure and access to materials and activities available within the NFS. FS completely supports these benefits as part of its mission to operate, maintain, and improve NFS assets.

Complicating the increased constraints on CIM funding, large amounts of the Agency's funding must be allocated to fight large wildfires. Wildfire suppression operations have had a substantial impact on the Agency's ability to financially plan, design, and implement responses to its growing portfolio of unmaintained infrastructure assets. Rising costs and fire borrowing have diverted much-needed funds away from CIM efforts, thereby increasing the delays and costs of deferred maintenance projects. As a solution, Congress enacted a wildfire cap adjustment that will virtually eliminate the need for fire borrowing starting in FY 2020.

Personnel availability to oversee the operation, maintenance, and improvement of the growing portfolio of deteriorating assets is a constraint on the Agency's ability to execute a comprehensive capital improvement plan. As of FY 2017, the Agency employed 27,543 permanent full-time employees, including 582 employees in the Agency's Washington, DC headquarters and 26,961 employees throughout regional and field offices.[10] This is roughly equal to the Agency's headcount in 1998. While the total number of permanent full-time employees remains nearly unchanged from 1998 to 2017, the number of employees in engineering and engineering support positions has fallen significantly, as shown in figure 2.[26] Included in figure 2 is the total deferred maintenance backlog for the years in which it was available. Lack of engineering and engineering support staff limits the ability of the Agency to plan for

[21] USDA Forest Service. Internal Documentation.
[22] USDA Forest Service. National Facility Assessment Team. (2014). *The Financial Sustainability of our Facility Portfolio.*
[23] Holtrop, J., Deputy Chief for National Forest System. (2008, May 15). *U.S. Forest Service response to the National Trust for Historic Preservation report, "The National Forest System: Cultural Resources at Risk—An Assessment and Needs Analysis."*
[24] National Register of Historic Places Website. (n.d.). Listing a Property.

[25] Advisory Council on Historic Preservation Website. (n.d.). Protecting Historic Properties Overview.
[26] USDA Forest Service. Internal Data from Washington Office.

and reduce the deferred maintenance backlog, which has remained at a similar level for the past decade.

The recreation and acquisition management departments face similar staffing challenges and reductions. As a result, there is a growing need for personnel who can develop, manage, maintain, and decommission FS infrastructure.
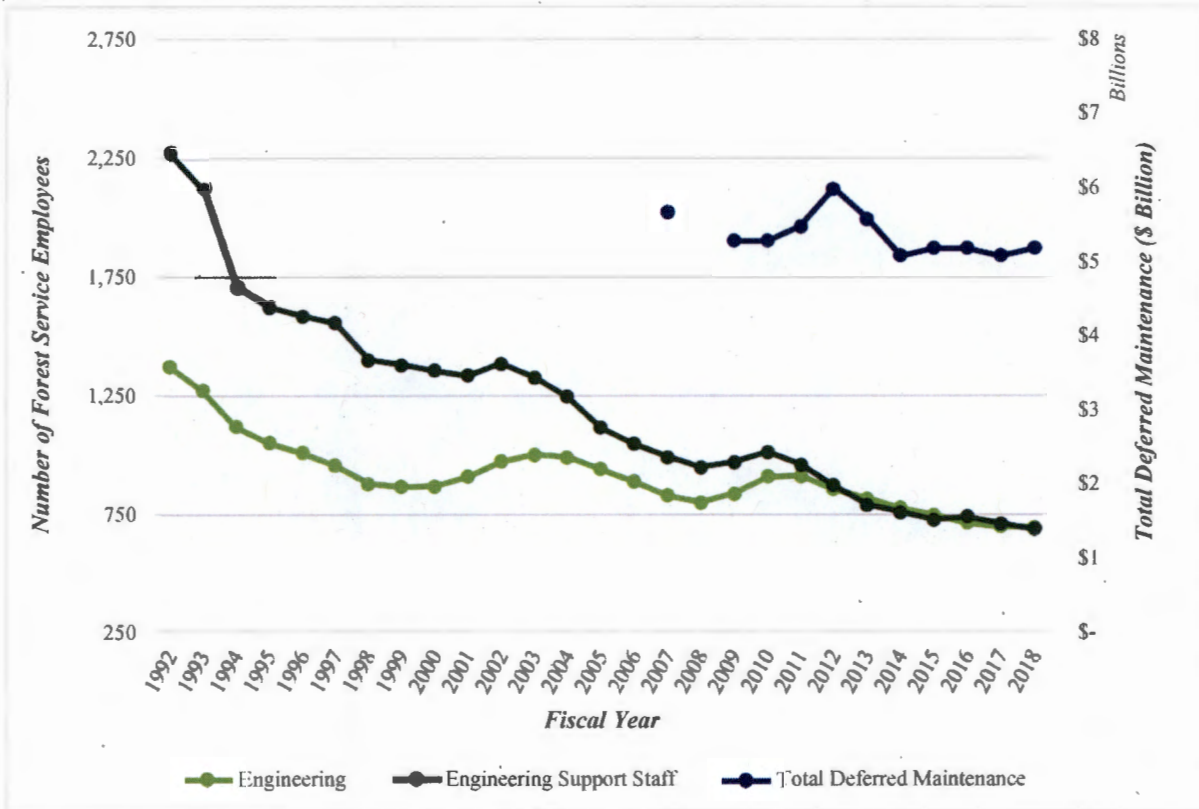

Figure 2: Number of FS employees in Engineering and Engineering Support Staff Positions and Total Deferred Maintenance Backlog, FY 1992 – FY 2018.

To continue to fulfill its mission despite the challenges of an aging asset portfolio and changing priorities, the Agency must focus on implementing effective asset management practices to support mission delivery. Furthermore, the Agency must continue to emphasize purposeful and strategic decommissioning of unneeded assets to decrease its physical footprint in accordance with Federal requirements, lessen the burden of maintaining unnecessary assets, and conserve funding for other mission-critical assets. A robust, adequately funded CCIP strategy will allow the Agency to invest in new assets for this era's priorities rather than sustaining aging assets that were built for historical initiatives.

3.2.1   Significant Rehabilitation Projects

The challenges the Agency faces in balancing land management and capital improvement priorities with funding and resource constraints are compounded by significant rehabilitation requirements that require multiyear funding. As part of the CCIP's long-term view on investment priorities, select projects may require specific, immediate attention because of unusual circumstances that pose significant risks to human health or safety, or that could cause significant harm to the resources the Agency is charged to

conserve. For instance, the Spirit Lake Outlet Project was constructed following the eruption of Mount St. Helens in 1980 to mitigate the risk of the lake overtopping the debris from a massive avalanche that plugged the North Folk Toutle River. Such an overflow would have caused catastrophic damage and led to the loss of life in downstream communities. The project, a 1.6-mile-long tunnel, effectively functions as the primary outlet for the lake. During the tunnel's 30-year life, engineering inspections have discovered displacements near previously identified shear zones that could threaten to block the tunnel after seismic events. Immediate repairs to the existing tunnel intake gate system are estimated at $6-8 million,[27] with full repairs estimated at $20-30 million. If repairs are not completed, the tunnel could fail, significantly increasing the risk of overflow. In addition, an effort is currently underway to identify a sustainable long-term management solution for the Spirit Lake outflow that considers alternative means for controlling the lake level.[28] Costs to construct the long-term alternative are well beyond the amount the Agency can typically budget in any given fiscal year.

[27] Owens, G. (n.d.). *Spirit Lake Outflow Project Work 2015-2018*. Gifford Pinchot National Forest: USDA Forest Service.
[28] USDA Forest Service Employee Communication with Working Group (November 30, 2018).

4 INFRASTRUCTURE PORTFOLIO

The Agency's infrastructure portfolio includes a variety of capital assets that require constant monitoring, maintenance, repair, and improvement. These assets include buildings, dams, recreation sites, wastewater systems, drinking water systems, bridges, roads, and trails.

Figure 3: FS Infrastructure Portfolio by Asset Type

Sources: USDA FS Strategic Plan: FY 2015 – FY 2020; NFS Statistics, FY 2017; USDA Forest Service Internal Data from Washington Office.; FS Deferred Maintenance Audit Report; Vector Toons; Clip Ground; Clker.com; Clipart Panda; weclipart.com; GoGraph; Stock Vector Art & Illustration; Concept Draw; Pinterest; Classroom Clipart

FS infrastructure is a vast and complex network of interconnected assets that must operate efficiently and interdependently to deliver on the Agency's mission to the public. For example, roads lead to recreation sites and trail networks and allow for timber to be hauled to processing mills. If transportation assets are in a state of disrepair, the interaction of visitors with the forest will be adversely affected. Similarly, fire management vehicles require facilities in which to be maintained, repaired, and stored, as well as roads and bridges to travel to fires. If any of these assets are unusable, fire management personnel will be unable to execute their jobs effectively.

Since 1992, FS has managed an infrastructure database, referred to as "Infra," to store data on natural resources, buildings, trails, roads, dams, recreation sites, communications sites, and wastewater systems, and drinking water systems. For funding purposes, these assets are currently grouped by existing budget line items (BLIs) referred to as CMFC (i.e., facilities), CMRD (i.e., transportation system infrastructure), and CMTL (i.e., trails). While these BLIs are not exhaustive of the entire FS portfolio, they do represent the majority of FS's portfolio and are the focus of this CCIP effort. Further details are provided below by asset type.

Facilities (CMFC)
The facilities category includes buildings, dams, recreation sites, water systems, wastewater systems, communication towers, and nurseries

Roads (CMRD)
The roads category includes roads, road bridges, and supporting infrastructure.

Trails (CMTL)
The trails category includes trails and trail bridges.

4.1 FACILITIES

Mount St. Helens Science & Learning Center, Gifford Pinchot National Forest, Washington

The CMFC BLI is used to fund capital improvements, maintenance, and repair of buildings, dams, recreation sites, wastewater systems, and drinking water systems. The Agency operates and maintains a large portfolio of facilities necessary to support its mission. These facilities also provide on-site real estate for employees to complete administrative duties.

4.1.1 Recreation Sites

To deliver on its mission to meet the needs of present and future generations of visitors to NFS lands, the Agency must enhance access to recreation sites and activities within the forest network. The Agency provides the largest number and widest range of recreational facilities in the country, including approximately 29,700 recreation sites[29] divided by 33 types of use, including campgrounds, picnic areas, visitor centers, target ranges, trailheads, ski areas, and observational sites.

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[29] USDA Forest Service Employee Communication with Working Group (October 24, 2018).

Approximately 20 percent of FS recreation sites generate partial revenue for operation, maintenance, and some capital investment through fees collected from visitors. [30] This revenue supplements federal funding sources to address some CIM needs; additionally, approximately one-third of recreation sites, including large, high-use campgrounds, are operated by private entities under a permit system, though FS maintains responsibility for the assets.

Community support and collaboration with local and state governments is needed to keep FS

Source: Recreation, George Washington & Jefferson National Forests, FS, USDA,

recreation sites usable to the public as visitation increases. To leverage community engagement, FS has established partnerships with organizations that support the proper operation and maintenance of some facilities, responsible use of recreation sites, and an improved forest experience. For example, FS partnered with the local governments in Vail County, Colorado, and Eagle County, Colorado, to enforce responsible visitor behavior in White River National Forest, thereby ensuring public areas are maintained in good condition.[31] As another example, in Lolo National Forest, community volunteers ensure that the Lolo Pass recreation site and trails remain clear of debris, while the Departments of Transportation in Montana and Idaho contributed four-fifths of the $5 million cost to build, but not maintain, a visitor center at the recreation site. [32] Unfortunately, to address deferred maintenance costs and limited resources, FS is considering permanently closing and decommissioning developed recreational inventory.

4.1.2 Buildings

FS utilizes 40,500 USDA-owned buildings to ensure the productive and sustainable use of the NFS lands. The Agency's buildings portfolio includes administrative buildings, research facilities, buildings dedicated to fire management activities and assets, visitor centers, bathrooms, communications towers, living quarters, and warehouses. Of these buildings, 62 percent are more than 25 years old and 39 percent are more than 50 years old.[33] Approximately 65 percent of the deferred maintenance backlog is attributable to buildings older than 50 years. The age of the buildings portfolio and the accumulation of deferred maintenance has resulted in the performance of standard maintenance on only 57 percent of buildings.[34] Many FS buildings have high energy and water usage costs due to their deteriorated condition. Additionally, many buildings were constructed at a time when efficiency and sustainability were not important. Furthermore, the Agency incurs more costs to modernize facilities to address updated codes, forest protection requirements, and access requirements to comply with the Americans with Disabilities Act.[34]

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[30] USDA Forest Service Employee Communication with Working Group (November 13, 2018).

[31] Quinton, S. (2018, October 18). *With Outdoor Recreation Tourism Booming, Towns Pick Up the Tab for Squeezed U.S. Forest Service.*

[32] Chaney, R. (2016, February 7). U.S. Forest Service Strategy Offers Candid Look at System in Disarray. *The Montana Standard.*

[33] McDonough, M., & Warbington, R. (2018, November 15). *Building Condition Assessment and Documentation - Part II Overview and Direction.* Presented at the USDA Forest Service National Facilities Meeting.

[34] USDA Forest Service Employee Communication with Working Group (October 21, 2018).

In addition to FS-owned buildings, FS leases buildings from private landlords for use exclusively by FS personnel or for shared use with the public. FS has approximately 280 leases nationwide that cost $67 million annually,[21] and these leased spaces account for approximately 47 percent of total office and warehouse space inventory under FS control.

The Agency's diverse portfolio includes buildings with varying missions and maintenance requirements. Its research facilities provide space for employees to conduct research on the forest environment and the social issues that affect local communities. Research facilities are also responsible for research of diverse topics such as climate change management, natural resource management, and wildfire suppression techniques. Agency-employed scientists aim to provide managers and policy makers with the knowledge and tools they need to sustainably manage NFS lands.

FS also manages administrative buildings withdrawn from public use and utilized solely by Agency employees for work purposes. These sites include ranger stations, guard stations, experiment stations, fire lookouts, patrol cabins, and similar administrative installations. These sites are critical for the Agency because personnel use them to complete administrative tasks needed to fulfill the Agency's mission.

The buildings portfolio includes buildings no longer needed to support the Agency's mission and buildings condemned due to safety hazards. These buildings present decommissioning opportunities to improve safety and reduce the deferred maintenance backlog. Prior to the implementation of the National Strategy for the Efficient Use of Real Property and the Reduce the Footprint Policy in Spring 2015, FS was already prioritizing the decommissioning of facilities, while working to increase the value derived from capital investments. Since FS began using Infra in 1992, it has disposed of 16,000 buildings of which 93 percent were older than 25 years and 54 percent were older than 50 years.[35]

Despite efforts to reduce deferred maintenance through strategic decommissioning, the deferred maintenance backlog throughout the buildings portfolio has continued to grow, increasing by $90 million over the past three years.[36, 37] To further expand its footprint reduction efforts, FS participates in the Service First initiative, which encourages four agencies—FS, the Bureau of Land Management (BLM), the National Park Service (NPS), and the U.S. Fish and Wildlife Service (USFWS)—to collocate available space. This collaboration results in lower operating costs and better customer service to the public. Yet, despite these decommissioning and consolidation strategies, the Agency still faces significant challenges in maintaining, selling, or decommissioning outdated buildings that continue to age and deteriorate.

[35] Suter, A. (2003). *Wilderness Permit Systems and the Forest Service's Infra Database*(Rep.). Washington, DC: USDA Forest Service Technology and Development Program.
[36] USDA Forest Service. (2016). *FY 2017 Congressional Budget Justification*. Washington DC.
[37] USDA Forest Service. Internal Data from Washington Office.

4.1.3 Drinking Water and Wastewater Systems

As of FY 2017, FS managed 4,736 wastewater systems and 4,710 drinking water systems, which sustain local communities and support building infrastructure and recreation sites.[38] These systems provide a supply of freshwater and treat wastewater effluent according to Safe Drinking Water Act (SDWA) standards.[39]

Proper maintenance of drinking water and wastewater systems is critical due to their impact on the environment, public health, and safety. These systems are constantly relied upon to provide fresh water and treated effluent, but maintaining safe water systems requires high-functioning facilities. FS tracks the condition of the physical assets and any required assessments of the systems.[6] Additionally, FS conducts water quality sampling and testing to comply with the SDWA.[39] NFS lands are the Nation's largest source of municipal water supply, serving more than 66 million people across 33 states. Major municipalities, including Los Angeles,

Source: Water System Disinfection, FS, USDA

Portland, Denver, and Atlanta, receive a significant portion of their water supply from national forests.[6] Special use permit authorizations are issued for this purpose, often to private entities.[40]

Like other FS asset types, drinking water and wastewater systems may be considered for decommissioning. However, decommissioning water systems is challenging compared to other asset types due to the basic support they provide to public health and the environment. Decommissioning of an asset within the drinking water and wastewater portfolio is dependent on the condition of system infrastructure, its ability to supply safe drinking water for human consumption, and the local demand for water supplied by the system.

4.1.4 Dams

The Agency's portfolio of dam assets comprises the largest source of municipal water supply in the Nation and serves people in 3,400 communities.[6] Water impounded by the dams helps maintain and support ecological and societal services, including biological diversity; threatened and endangered species and habitat preservation; spawning and rearing habitats for sport and commercial fishing; and agricultural irrigation, navigation, and flood control. As of FY 2019, the Agency owned and operated approximately 460 dams, as well as varying degrees of oversite and regulation of more than 1,300 dams owned and

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[38] USDA Forest Service. (2019). *National Forest System Statistics FY 2018*
[39] USDA Forest Service Employee Communication with Working Group (October 23, 2018).
[40] USDA Forest Service Internal Documentation.

operated by private-sector entities. Typically, oversight and regulation of these private dams is conducted in tandem with other Federal and state agencies. In addition, the dam program responsibilities include, but are not limited to, processing ditch bills, reviewing submittals on authorized dams, enforcing actions on authorized dams, and reviewing Power Act (i.e., section 4e) submissions related to hydropower projects contained within the NFS and regulated by the Federal Energy Regulatory Commission. Data from FY 2013 indicates 80 percent of FS-owned dams are more than 30 years old, with 55 percent more than 50 years old.[41]

Program managers for this asset type face additional funding challenges. Before FY 2018, the dam portfolio did not receive dedicated funding from Congressional appropriations—either directly to the Agency or through USDA. The lack of dedicated funding affects the FS's ability to adequately maintain the inventory of USDA-owned dams and reduce risks. In FY 2018, FS developed a strategy to focus financial and staffing resources on dam assets by temporarily allocating $3 million for compliance with FS dam safety policy, minor repairs, and decommission planning. This strategy prioritizes dam projects that the public depends on and that are likely to cause extensive

Hume Lake Dam, Sequoia National Forest, California.

environmental and economic damage in the event of failure.[42] Currently, FS has 46 high-hazard dams and 72 significant-hazard dams, with the remaining dams categorized as low hazard. However, the entire dam portfolio is currently being evaluated and the number of high- and significant-hazard dams is expected to increase substantially based on preliminary screening. As a result of the annual $3 million CIM funding for dam safety, risk in the dam portfolio is now assessed quantitatively, allowing for targeted expenditures of funds to reduce average risk across the inventory.[43]

Dam safety compliance funds are expensed to ensure FS-owned dams comply with FS dam safety policy, which follows Federal Emergency Management Agency guidance. The funds directly or indirectly support dam safety functions, including oversight of authorized dams, waste impoundments (i.e., active, inactive, and abandoned), water conveyance infrastructure, and thousands of smaller dams that do not meet the jurisdictional size and storage criteria to be included in internal Agency records.

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[41] Data on FS dams can fluctuate frequently because of acquisition of dams through land acquisitions and abandoned permits. Changes in the jurisdictional status resulting from the periodic reevaluation of water and other impoundments can also impact the data. USDA Forest Service Dams Program Employee Interview with Working Group (October 31, 2018).

[42] USDA Forest Service. (2018). *Forest Service National Capital Investment Program FY19-20 Submission Instructions.*

[43] USDA Forest Service Dams Program Employee Interview with Working Group (October 31, 2018).

4.2 TRANSPORTATION SYSTEM INFRASTRUCTURE

An extensive transportation network is vital to the Agency's ability to successfully achieve its mission to sustain the health, diversity, and productivity of NFS lands to meet the needs of present and future generations.

The Agency's transportation network provides for the transport of resources, employees, and visitors within NFS lands. The road network provides a social benefit by connecting visitors with recreation sites and resources and FS personnel with the people they serve, allowing the FS to follow through on its commitment to meet the needs of the public. Roads and road bridges also directly contribute to FS's ability to detect and respond to fires and other threats, thereby protecting visitors, wildlife, and valuable resources. Since the transportation network is so extensive, emergency needs can be met by the expedient and safe travel of response vehicles.

Taylor Fork Bridge, Gallatin National Forest, Montana

Fulfilling the Agency's mission requires well-maintained roads, road bridges, culverts, signage, guard rails, and walls. Many FS roads were built through proceeds from timber sales between the 1940s and the 1970s. These roads have remained open for use by the timber industry, as well as for the recreational use of the public. Since the 1980s, FS timber production has decreased, while recreational options on NFS lands have increased, resulting in a wide variety of vehicles utilizing roads and road bridges. Roads and road bridges originally designed for timber vehicles are now more frequently used by passenger cars and recreational vehicles. Additionally, the mechanisms that funded the construction of roads and bridges in the middle of the 20th century do not support the maintenance now required for these roads and bridges.[44]

The Agency's budget structure allows separate funding for roads, road bridges, and other road-related infrastructure through the CMRD BLI. At the national level, funding for road and road bridge CIM is allocated to regions based on the number of recreational visits, total land area, timber volume sold, and hazardous fuel acres treated per region.[45]

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[44] USDA Forest Service Employee Communication with Working Group (October 26, 2018).
[45] USDA Forest Service Employee Interview with Working Group (October 30, 2018).

Funding from CMRD and FLTP is also needed for Aquatic Organism Passages (AOP), which reduces funding available for other parts of the road system. Assessments across the NFS indicate that 20,000 road-stream crossings block access to aquatic species. The AOP initiative is essential as it covers an extensive portion of NFS roads (NFSRs) and 400,000 miles of fish-bearing streams.[46]

4.2.1 Roads

As of FY 2019, there were approximately 370,000 miles of NFSRs under FS jurisdiction. NFSRs connect NFS lands to the Nation and enable private investment and recreational opportunities for millions of Americans. Maintenance of these roads has declined over the last 20 years, while public demand has escalated, causing the aging network to deteriorate. Although NFSRs provide visitors and businesses with access to outdoor recreation, agriculture, and permitted resource extraction, they can degrade fish and wildlife habitats and be unsafe for vehicle travel when not properly maintained. Strategic investment is critical to preserve access while limiting disruption to rural communities and the environment.

The NFSR network is quite different from a typical municipal road network or an interstate highway. Of its 370,000 miles of road, only 65,000 miles are maintained for standard passenger car use.[47] Yet road assets comprise more than $3 billion of the Agency's $5.2 billion deferred maintenance backlog.[38] The remainder of the NFSR network is stored for future use, managed as access for high-clearance vehicles, and includes most roads used for fire management and resource extraction. These stored and high-clearance roads are not included in the Agency's deferred maintenance backlog calculations; therefore, it can be inferred that the total amount of deferred maintenance for the NFSR network is even higher than the $3 billion figure above.

Superior National Forest, Minnesota

The geographically dispersed and extensive NFSR network requires the FS to implement policies that outline travel analysis protocols to effectively manage roads. However, operational levels of service are often below planned road objectives due to accumulated deferred maintenance. With evolving access priorities, the Agency must constantly evaluate the needs, risks, priorities, and decommissioning opportunities of its road system.

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[46] USDA Forest Service Employee Communication with Working Group (November 30, 2018).
[47] USDA Forest Service Employee Communication with Working Group (October 26, 2018).

4.2.2 Road Bridges

Well-maintained bridges provide needed access for emergency response vehicles, FS personnel, forest visitors, and timber harvesting. Bridges in poor condition or older bridges not designed for current loads can impede economic activity, reduce watershed health, and hinder aquatic habitat connectivity. As of FY 2018, FS had an inventory of 6,200 road bridges. Approximately 75 percent of the bridge inventory is more than 40 years old, and 10 percent is in poor condition.

Although FS road bridges are intended to function differently than high-traffic volume bridges, as a public road agency, FS implements the same comprehensive bridge inspection program as other public road agencies in accordance with the Federal Highway Administration's
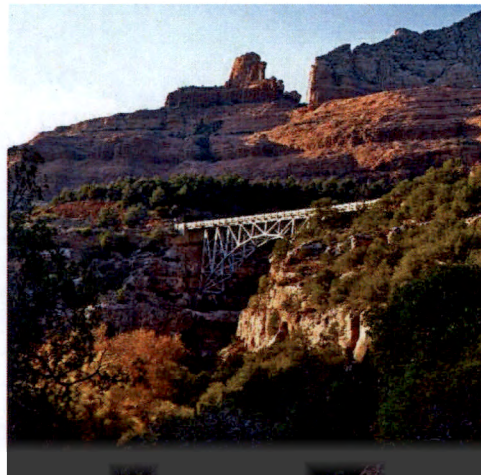
Midgley Bridge, as seen from the Huckaby Trail, Coconino National Forest, Arizona

National Bridge Inspection Standards.[48] Through this program, FS collects condition data and calculates current load capacities given bridge age and condition and manages overloads resulting from the demands of large, heavy trucks used for resource management activities, including timber restoration and fire management. This data is used to prioritize bridge rehabilitation or replacement projects along with road travel analysis strategies.

4.3 TRAILS AND TRAIL BRIDGES

The FS trail network provides local communities and 84 million annual visitors with extensive recreational access to NFS lands, thereby helping FS execute the most public-facing component of its mission—meeting the needs of present and future generations.[1,49] FS is the lead institution responsible for trail coordination, including the administration of six national trails and portions of 16 other National Scenic and Historic Trails.[50] FS partners with the NPS and the BLM to manage national recreation trails.[51] Trail and trail bridge funding is allocated through the CMTL BLI.

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[48] *Bridges, Structures, and Hydraulics*, 23 C.F.R. § 650. (2018).
[49] *U.S. Department of Agriculture Blog. Moore, L. (2018, July 20). Forest Service Trails are Where Adventures Begin.*
[50] USDA Forest Service Website. (n.d.). National Forest System Trails.
[51] The National Trails System Act, 16 U.S.C. § 1241-1251.

White Mountain National Forest, New Hampshire

Of the various types of assets FS manages, trails provide perhaps the most intimate and direct connection between visitors and NFS lands. Because of the important role of trails, FS must ensure its trail network is sustainable for future use. To that end, FS's National Strategy for a Sustainable Trail System, published and released by the USDA in February 2018, was developed with input from Agency employees, partners, and volunteers. The strategy established a bold vision for a sustainable trail system achieved through collaborative stewardship. The strategy outlined 26 strategic actions to move the trails program forward during the next decade.[52] In accordance with this strategy, the Agency is launching a 10-Year Sustainable Trail System Challenge in 2019 that will leverage critical investments in Agency and partner resources.

As of FY 2018, there were approximately 158,700 miles of trails within the NFS, with 98,400 miles (62 percent) managed for non-motorized use and 60,300 miles (38 percent) managed for motorized use. More than 20 percent of FS trails are located inside designated wilderness areas or areas completely unaltered by development—"preserved and protected in their natural condition."[52] Approximately 12,000 miles of system trail inventory are designated National Scenic and Historic Trails.

Trails and trail bridges represent $286 million of the Agency's $5.2 billion deferred maintenance backlog.[38] In recent years, FS reported accomplishing maintenance on only 37 percent of its trail miles, which had "a range of negative effects, such as inhibiting trail use and harming natural resources."[53] For example, fallen logs across trails potentially impede hikers or block horseback riders, mountain bikes, or off-road vehicles entirely. In some cases, private citizens take the initiative to clear paths using their own time and equipment. Standing dead trees, hazardous trail bridges, and lack of navigation references are additional hazards FS

Example of a failing trail bridge, Beaverhead-Deerlodge National Forest, Montana.

personnel identified on the trails. Some FS trails are "so overgrown or crowded with dead trees" that they are considered "functionally closed." [53]

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[52] USDA Forest Service. (2017). *National Strategy for a Sustainable Trail System* (Rep. No. FS-1095b).
[53] U.S. GAO. (2013). *Forest Service Trails: Long- and Short-Term Improvements Could Reduce Maintenance Backlog and Enhance System Sustainability. (Rep. No. GAO-13-618).*

5 COMPREHENSIVE CAPITAL IMPROVEMENT PLAN

5.1 PREVIOUS CIM STRATEGIES

As stewards of the Nation's NFS lands for present and future generations, FS is tasked with maintaining capital assets in operational condition for public enjoyment and economic benefit. But the Agency's ability to meet its goals is dependent on the condition of those capital assets, underscoring the importance of an effective asset management program. For example, an extensive transportation network of roads, road bridges, and trails supports various activities—outdoor recreation, hunting, fishing, timber production, livestock grazing, mineral production, and others—that support the livelihoods of communities located around the national forests and grasslands. Similarly, effectively maintaining assets such as camp sites, picnic areas, recreation buildings, and hiking trails provides a means for people to connect with nature and the outdoors, translating into public health benefits.[9,54]

Over the last two decades, the Agency has explored several possible solutions to improve CIM efforts. In 2000, FS considered adopting a working capital fund (WCF) approach with plans to begin in FY 2003. A WCF that "cover[s] both the maintenance of facilities and their replacement at the end of their useful life" has been effective for the fiscal management of FS personal property (e.g., vehicle fleet, computers, and other movable assets). However, the Agency did not receive authorization from USDA, the Office of Management and Budget (OMB), or Congress to implement the WCF for facilities. CMFC funding has fallen from $208 million in 2005 to $75 million in 2012—well below the accrued deferred maintenance on recreational facilities that it needs to fund.[10] In 2013, the Agency proposed a new model for CMFC funds that involved establishing a standard approach for funding allocation and identifying high-priority CIM projects. Within the CMFC BLI, a National Priority List was created to fund large-scale, high-priority projects. Between FY 2013 and FY 2017, this allocation was approximately $3 million annually,[55] which was insufficient to meet the Agency's needs, and the funding model was discontinued in FY 2017.[56]

Asset management strategies for FS roads have also undergone several recent changes. In FY 2012, the Moving Ahead for Progress in the 21st Century Act ("MAP-21") became "the first long-term highway authorization enacted since 2005." MAP-21 eliminated the Forest Highway program, which tended to apply a "stove piped" approach to asset management, and replaced it by authorizing the FLTP, which distributes funding to FS for improvements to its transportation network.[10] It also authorized the more inclusive Federal Lands Access Program (FLAP) to improve transportation infrastructure that provides access to, is adjacent to, or is located within Federal lands, and the Emergency Relief for Federally Owned Roads (ERFO) program, which administers emergency relief for federally owned roads that are open to public travel and are found to have suffered serious damage by a natural disaster over a wide area or by a catastrophic failure. In FY 2016, the Fixing America's Surface Transportation (FAST) Act reauthorized FLAP and FLTP. These

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[54] Kline, Jeffrey D.; Rosenberger, Randall S.; White, Eric M. (2011). *A National Assessment of Physical Activity on U.S. National Forests.* Journal of Forestry. 109(6): 343-351.

[55] USDA Forest Service. Internal Data from Washington Office.

[56] USDA Forest Service Employee Communication with Working Group (October 9, 2018).

programs benefit the FS road network, but their funding levels are much less than the amount needed to address the deferred maintenance backlog.[27]

While MAP-21, FLAP, and FLTP were aimed at improving FS's capital assets, each initiative only addressed one asset category or type. The WCF and National Priority List were designed specifically for the facilities budget (i.e., CMFC BLI). Subsequent legislation that reauthorized FLAP and FLTP was written with road maintenance and improvement in mind. The plan outlined in this document will be the first comprehensive effort aimed at the different asset types simultaneously.

To efficiently build on these previous efforts, the implementation of the proposed CCIP will lean on existing condition assessment programs that were developed to support previous CIP efforts. To determine condition, the Agency utilizes industry-standard assessments in accordance with the required frequencies (e.g., every two years for bridges and every five years for other assets). FS tailors the comprehensiveness of its assessments to the complexity of each facility assessed.

Buildings are categorized into two asset types:

- **Basic Buildings**—These buildings have no electrical service, heating, ventilation, air conditioning (HVAC) service, or plumbing—generally, the most critical and expensive components of a building. These buildings are primarily assessed for structural integrity and exterior features. Accessibility issues, foundation condition, roofing, gutters, exterior steps and ramps, decks, railing, siding, exterior doors, garage doors, exterior and interior paint, and windows are assessed. The FS portfolio includes barns, sheds, shelters, and more than 17,000 toilet structures under this category.

- **Complex Buildings**—These have at least one of three additional features: electrical service, HVAC service, or plumbing. They are assessed based on the same aspects as basic buildings, as well as the condition of their electrical, HVAC, and plumbing systems.[57]

Additionally, with a road network covering approximately 370,400 miles, FS cannot reliably inspect every mile on a recurring basis. Instead, FS employs spot inspections and statistical analysis to determine condition and estimate maintenance. These numbers are then extrapolated over the length of a passenger car road. Meanwhile, FS bridges are inspected in accordance with USDOT's National Bridge Inspection Standards.

The Agency has adopted many leading industry practices. The Institute of Asset Management (IAM) defines an effective asset management program as one that systematically and holistically coordinates its processes to optimally and sustainably manage its assets, including their performance, risks, and lifecycle costs in pursuit of the organization's strategic goals.[58] This concept is reaffirmed in a study

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[57] USDA Forest Service. (n.d.). Condition Assessment Training; *Basic Building Condition Assessment Part 3, Building Condition Assessment and Documentation Part I – Introduction, Building Condition Assessment and Documentation Part IV – Mechanical, Electrical, & Plumbing.*
[58] Institute of Asset Management (IAM). (2008 September). *Asset Management Part 1: Specification for the Optimized Management of Physical Assets.* PAS 55-1:2008.

titled, "Core Competencies for Federal Facilities Asset Management Through 2020: Transformational Strategies," which concluded three core competencies are critical to asset management programs:

1. Integrating people, processes, places, and technologies by using a lifecycle approach to facilities asset management.
2. Aligning the facilities portfolio with the organization's missions and available resources.
3. Innovating across traditional functional lines and processes to address changing requirements and opportunities. [59]

The key themes are clear—successful asset management requires an integrated and holistic outlook focused on a sustainable lifecycle approach aligned to organizational goals. To effectively manage its broad range of assets with limited funding, FS will adopt these guiding principles to develop a comprehensive, multiyear capital plan that will guide its investments in facilities, transportation systems, bridges, dams, recreation assets and trails, and other mission critical infrastructure.

5.2   CCIP DEVELOPMENT

As of 2018, the Agency's deferred maintenance backlog totaled more than $5 billion dollars. As a result, FS charged itself with developing a comprehensive approach to improve operational management, performance measures, and financial stewardship of its infrastructure portfolio. To formulate a long-term CCIP that accounted for future needs while capitalizing on existing processes, an internal working group based in the Washington, DC, office (WO) was organized to manage CCIP development. The working group teamed with a professional services firm for insight on industry expertise and leading practices.

The working group started with an evaluation framework to capture past FS efforts, assess current operating maturity, and examine baseline practices against relevant standards. The working group employed leading risk management and decision analysis principles to develop a realistic, measurable, and implementable CCIP framework.

Professional organizations and research literature cover many concepts around proper asset management and capital planning. To develop a robust and defensible CCIP framework that acknowledges these principles, the working group conducted an extensive review of more than 100 references across available FS publications, governmental guidance, leading industry cases, professional organization recommendations, and academic research. A sample of research reviewed included, but was not limited to:

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[59] National Research Council. (2008). *Core Competencies for Federal Facilities Asset Management Through 2020: Transformational Strategies.* Washington DC: The National Academy Press. https://doi.org/10.17226/12049.

OMB Capital Programming Guide Version 3.0[60]	General Accountability Office (GAO) Reports: "Leading Practices in Capital Decision Making"[61] and "Process Exists for Prioritizing Asset Maintenance Decisions, but Evaluation Could Improve Efforts"[62]
ISO Asset Management—Overview, Principles, and Terminology[63]	The Wall Street Journal's CFO Journals: "Will Your Investments Deliver the Desired Result?"[64] and Capital Expenditure Planning: Using Metrics to Monitor Effectiveness"[65]
Business Horizons Volume 61, Issue 4: "Integrating Lifecycle Asset Management in the Public Sector"[66]	APPA 1000-1: "Total Cost of Ownership for Facilities Asset Management"[67]
International Facility Management Association: "Digging Out of Deferred Maintenance"[68]	National Academies Report: "Achieving High-Performance Federal Facilities: Strategies and Approaches for Transformational Change"[69]
National Academies Report: "Core Competencies for Federal Facilities Asset Management Through 2020"[59]	FS CMFC Funding Model—Dynamic Analysis

In addition to these references, the working group interviewed nearly three dozen FS personnel, distributed a survey across FS regions and research stations nationwide, and hosted multiple virtual and in-person meetings with various FS program stakeholders to review the initial findings, collaborate on the proposed framework, and solicit feedback from delivery-focused personnel. The following sections detail each major step toward developing the proposed CCIP.

5.2.1   Document Review

The working group assessed FS's current practices and processes to isolate areas within the existing process that require further research and analysis, identify observed gaps in current processes, and gather suggested practices aimed at improving these processes.

This effort included evaluation of the ratio of current CIM appropriations and portfolio size against industry standard ratios, primarily finding that, based on the portfolio size, CIM appropriations are insufficient to maintain industry standards across the FS capital portfolio. This discovery substantiated previous evidence that additional funding is required to keep pace with the portfolio's requirements and address the approximately $5 billion deferred maintenance backlog.

[60] Executive Office of the President of the United States, Office of Management and Budget. (2017). *Capital Programming Guide V 3.0 - Supplement to OMB Circular A-11: Planning, Budgeting, and Acquisition of Capital Assets.* Washington, DC.

[61] U.S. General Accounting Office. (1998). *Executive Guide: Leading Practices in Capital Decision-Making.* (Rep. No. GAO/AIMD-99-32).

[62] U.S. GAO. (2016) *National Park Service: Process Exists for Prioritizing Asset Maintenance Decisions, but Evaluation Could Improve Efforts.* (Rep. No. GAO-17-136).

[63] International Organization for Standardization. (2014). *ISO 55000:2014 Management – Overview, Principles, and Terminology.*

[64] CFO Journal. (2016, July 12). Capex: Will Your Investments Deliver the Desired Result? *The Wall Street Journal.*

[65] CFO Journal. (2013, January 29). Capital Expenditure Planning: Using Metrics to Monitor Effectiveness. *The Wall Street Journal.*

[66] Driessnack, J. D., & Olde Stone Consulting, LLC. (2017). *Time to Update OMB Capital Programming Guidance* (White Paper). Project Management Institute.

[67] APPA: Leadership in Educational Facilities. (2017). *APPA 1000-1: Total Cost of Ownership for Facilities Asset Management* (Rep.).

[68] Rimer, J. (2016). Digging Out of Deferred Maintenance. *International Facility Management Association FMJ Magazine, May/June.*

[69] National Research Council. (2011). *Achieving High-Performance Federal Facilities: Strategies and Approaches for Transformational Change.* Washington, DC: The National Academies Press. https://doi.org/10.17226/13140.

5.2.2 Interviews

The working group completed multiple interviews with national, regional, and forest leadership as well as members of the Agency's Engineering, Technology, and Geospatial Services group. Interviewees included national and regional engineers, forest supervisors, and national program managers. These interviews were critical to understanding how improvement, maintenance, and decommissioning projects are currently prioritized throughout the regions and research stations. The interviews also provided an opportunity to discuss the purpose and desired outcomes of the CCIP effort, as well as facilitate consensus across functions and regions.

Interviews provided historical context to past Agency capital improvement initiatives, validated findings from the document review, and identified additional challenges related to current processes. Interviews with national leadership focused on understanding the strategic goals and vision, gaining insight on the scope of maintenance needs and prioritization efforts, and identifying details needed for an effective governance structure. Meetings with regional leadership focused on local processes used to address CIM needs, the impact of budget cuts on other mission-related activities, and the success of current processes at the regional level. The working group also identified project attributes, centered on benefit and risk measures, that could provide a comprehensive basis for a prioritization method to set and rank capital improvement projects.

Subsequent interviews held with the Strategic Planning, Budget and Accountability Performance (SPBA) group focused on the budgeting and justification process, historical trends around fund use, and perceived CIM impacts related to BLI funds associated with the budget structure initiative. These interviews also outlined how the budgeting process influences the Agency's prioritization process, such as fund allocation to address maintenance issues over other mission-related activities. From these interviews, the working group captured valuable information regarding the Agency's current prioritization processes and the potential impacts of future CIM methods.

5.2.3 Agency-Wide Survey

The working group developed and distributed a survey for Agency stakeholders at the district, regional, national, and research station levels to extend participation in the CCIP framework development. This survey allowed stakeholders to provide feedback on the proposed CCIP process, including the potential attributes to be used for project evaluation. Identification of these attributes allowed the working group and the Agency to build a consensus around organizational CIM priorities across different asset types. By expanding survey participation, the working group gathered a larger sample set of responses that helped reduce the impact of individual bias in the aggregated results. Additionally, the survey captured differences in priorities across regions and research stations to include any unique, geographical considerations.

5.2.4 Additional Stakeholder Engagement

The Agency also hosted multiple in-person and virtual meetings for stakeholders to share their thoughts on the proposed process for the CCIP. These meetings were used to gather feedback and secure consensus on the CCIP approach and development. The following meetings allowed attendees to share their

perspectives and voice concerns as to whether the proposal will meet the Agency's needs and can be easily incorporated into existing regional or research station processes.

BLI Stakeholder Meeting

In-person meetings were held with each program manager of the three BLI groups—CMFC, CMRD, and CMTL—throughout the development of the CCIP. This allowed the working group to gain a better understanding of the priorities and risks present in each asset type when planning capital projects from a financial perspective. Each of the BLI groups were able to highlight current planning and programming practices that work, as well as provide insight as to whether additional opportunities exist to improve these processes. The three BLI groups were also able to provide feedback on the initial draft of project risk and benefit attributes that would inform the integrated process for the proposed CCIP.

National Engineering Leadership Team Meeting

The Agency held a conference in Coeur d'Alene, Idaho, for the National Engineering Leadership Team to discuss its successes and hurdles when completing capital projects. During this conference, the baseline project attributes were discussed. The conference also provided an opportunity for the team to provide feedback on the CCIP framework, including whether it could be easily incorporated within their existing regional or research station processes. As it relates to long-term governance and sustainability of any capital plan framework, understanding the perspective of those ultimately responsible for the plan's implementation and project delivery is critical to developing a realistic and achievable plan that balances the needs of the overall mission against any operational constraints or risks anticipated by those in the field.

Model Prototype Demonstration Meeting

To provide insight into the potential tools for advancing the proposed CCIP, the working group hosted a meeting to demonstrate an optimization model prototype, which is explained further within this report. Using knowledge gained from the document review, interviews, survey, and additional stakeholder engagement, the working group prepared the prototype based on refined project attributes. The prototype allowed the ranking of multiple capital projects from differing asset classes based on their importance to the Agency's mission and simulates annual CIM spending, recapitalization costs, and deferred maintenance. More than 60 participants joined the virtual meeting to understand the industry-leading practices and principles around portfolio optimization, multiattribute decision analysis (MADA), and the multiyear framework that will guide the CCIP. This meeting also functioned as an opportunity to gather feedback on the development and proposed functionality for a model FS intends to implement as the next step in this CCIP effort.

5.3 INTRODUCTION OF A PORTFOLIO OPTIMIZATION PROCESS

In the Federal environment, where political and socioeconomic factors dramatically affect an agency's ability to meet its mission, the need for a transparent, defensible budget allocation process is critical to meeting both oversight requirements and changing mission objectives. As budgets continue to contract while assets continue to age, making critical decisions regarding where to efficiently spend the next dollar has become increasingly important, as these decisions often have direct and serious impacts on the organization's ability to meet its mission objectives.

Challenges come not only from the need to respond effectively to changes outside the Agency's control, such as new policy direction or unforeseen changes in the operating environment, but also from the need to forecast and program the operating and capital investment budget for upcoming years in which funding amounts are uncertain.

To meet these challenges, FS will operate a national project selection process based on the Multi-Attribute Decision Analysis (MADA) concept, which will quantitatively link individual project values into the budget allocation process. This will improve understanding on where each new dollar should be spent, focus the limited budget on areas that will produce the most value, and strengthen the defense of budgets to stakeholders during programming.

> ### Alignment with FY 18 Omnibus Appropriations Bill Objectives for CCIP
>
> In the FY 18 Omnibus Appropriations Bill, Congress outlined objectives for an FS CCIP that establishes a "long-term, multi-year plan to guide needed investments in buildings, facilities, transportation systems, and other infrastructure:"
> - Establish a process for setting and ranking construction and maintenance priorities;
> - Reflect the Service's mission, goals, and requirements;
> - Identify facilities, roads, and other infrastructure that should be disposed of or decommissioned;
> - Consider existing investments in planning, construction, and maintenance, as well as deferred maintenance needs; and
> - Identify future needs for investment to improve the physical infrastructure and health of the national forests.

5.3.1 MADA Overview and Benefits

MADA is a decision-making methodology designed to evaluate multiple, and often conflicting, criteria in a structured and quantitative way. It breaks down complex and convoluted decisions into smaller, more manageable judgements that follow a repeatable process:

1. Identify alternatives.
2. Identify and structure objectives.
3. Identify performance measures for each objective.
4. Assess performance of alternatives against objectives.
5. Convert performance measurement scores into overall alternative benefit scores.

The Agency's national project selection process will execute MADA through an optimization model that will maximize the achievement of organizational priorities while minimizing anticipated risks and managing costs. Leveraging an optimization model within the overall capital management process will improve efficiency and outcomes that promote proactive, multiyear planning. A MADA process with an optimization model offers several benefits over an ordinary prioritization process:

	Ordinary Prioritization	MADA Optimization
Transparency	Use of standardized criteria can clarify project selection decisions to stakeholders, but delivery teams may not have visibility into the quantification processes for each criterion.	Leverages as much existing data as possible, giving clear visibility to stakeholders across levels.
Objectivity	Limited in its objectivity, as criteria are often quantified in different ways for different projects, or are applied unevenly across the portfolio.	Increases objectivity by moving criteria quantification away from potential biased human judgement and toward existing data.
Mission Alignment	Includes criteria that are not necessarily tied to a project's impact on the mission.	Separates project attributes and focuses optimization only on attributes tied to a project's mission alignment.
Stability and Predictability	Incorporates criteria regarding the readiness of projects, but ignores the multiyear nature of capital planning.	Measures and incorporates project risk factors and readiness to produce multiyear project schedules, reducing delivery risk and increasing year-to-year predictability.
Flexibility	Produces static scores, requiring a recalculation of project scores if demands on the organization forced a change or reprioritization of objectives.	Quickly responds to changing organizational demands and dynamic real-world scenarios without overhauling the process by tying project benefits directly to objectives.
Optimization	Includes cost as an individual criterion weighed against other criteria, losing insight into the exact benefit-to-cost ratio that the organization should maximize.	Specifically designed to optimize the use of limited resources by maximizing project value against costs, delivery risks, and defined constraints.

5.3.2 Process Overview

The Agency will adopt a structured CCIP process that incorporates MADA and leading capital management practices to achieve the following three implementation goals:

1. Establish an iterative, repeatable budgeting process to allocate funding to appropriate ownership levels.
2. Develop an objective project prioritization methodology that quantitatively assesses project value and risk considerations and multiyear programming, while maintaining maximum flexibility.
3. Implement a governance structure with clear roles and responsibilities.

The approach will use an optimization model for project selection that measures individual projects against a common range of metrics that align to overall organizational strategy and allow FS to quantitatively see the effects of adjusting CIM funds. It will also quantify the potential value each combination of projects is likely to deliver and will facilitate quick recalculations based on new or changing priorities. Performing this analysis from the portfolio perspective (i.e., FS, irrespective of regional or asset subdivisions) will provide clear organizational alignment and insight into what projects will contribute to the organization's strategic objectives. This process will consist of three steps:

Figure 4: Project Selection Process Diagram

Project Identification and Data Collection

Projects will continue to be identified at the regional, forest, and research station level. Regions and research stations may leverage asset prioritization methodologies to determine which of their assets should be targeted for capital improvement funding. As noted earlier, leveraging existing data and associated collection processes offers multiple benefits: faster and wider adoption of the CCIP framework, avoidance of "retraining" staff on new systems or processes, and minimization of data issues like incorrect or missing entries. Meanwhile, capital improvement projects with significant costs will continue to be captured at the national level, with data pertaining to the relevant attributes of that project or the affected asset collected in a standardized database.

Project Analysis and Optimization

Project data will be aggregated and analyzed to determine which projects provide the most benefit to the organization and which meet high-level national goals. Projects requiring more information may be circulated back to the field for update. The optimization process, further detailed below, will maximize the cumulative benefit to the organization by iterating through

> **Alignment with FY 18 Omnibus Appropriations Bill Objectives for CCIP**
>
> This CCIP establishes a process at the National level for **setting and ranking construction and maintenance priorities** based on project attributes that tie directly to the Agency's **mission, goals, and requirements**.

combinations of projects within the portfolio. This process will result in the selection of the most beneficial projects that adhere to organizational risk constraints and that can be completed within funding and resource limitations. The optimization process will be repeated over a multiyear period to generate a recommended project schedule and will be repeated annually so that project lists stay abreast of changes in national priority.

Review and Approval

This process will include programmatic and executive review of the recommended project schedule and will allow for manual overrides in special cases. Manual overrides can be used in nuanced situations where the executives determine that exceptions to model output are warranted. For example, if new facilities in support of firefighting (e.g., vehicle storage, maintenance bays, etc.) are required in California following a major event, those projects could be immediately prioritized regardless of the optimization model results.

If desired, overrides can be circulated back to the optimization process, identifying the optimal portfolio of projects after inclusion/exclusion of specific projects. Once reviewed, the portfolio of projects is submitted for approval at the executive level. Projects not selected remain in the database for future consideration, simplifying the data collection process in subsequent years.

5.3.3 Coordination with Existing Processes

Rather than replacing existing processes, the introduction of a portfolio optimization process will build on successful existing processes within FS asset management. As noted earlier, the benefit of integrating as much of the existing processes as feasible helps with streamlining the user transition and adoption of the new approach. Furthermore, it focuses on reducing unnecessary workload on the delivery teams—allowing them to focus on thoughtfully developing potential projects, accurately detailing those project requirements, and ultimately successfully delivering those projects in the field.

> **Alignment with FY 18 Omnibus Appropriations Bill Objectives for CCIP**
>
> By building on **existing** asset management processes, the CCIP will be **integrated with current** investments in planning, construction, and maintenance and deferred maintenance needs.

For example, the working group collaborated with various stakeholders to select the most viable existing processes for incorporation and collectively agreed on the following in the CCIP framework:
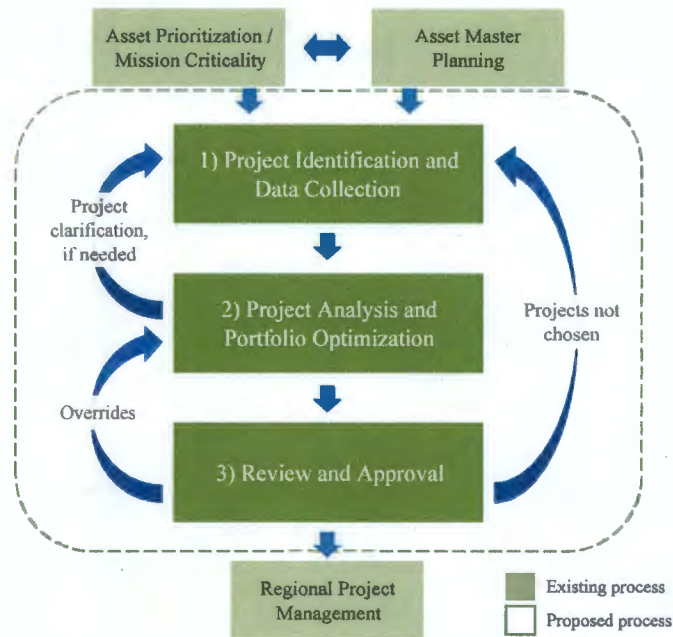

Figure 5: Integration of Existing Processes with Project Selection Process

1. **Asset priority and mission criticality** processes are already in use at the regional, forest, and research station levels to prioritize certain FS assets based on factors such as substitutability, revenue generation, and mission importance. This includes specific processes such as the Travel Management Rule that requires identification of the minimum road system needed for safe and efficient travel, administration, utilization, and protection of NFS lands. These processes allow the

prioritization of assets for routine maintenance and will be standardized across the organization and leveraged within the identification phase to determine the assets most in need of critical capital improvements.

2. **Master planning** processes take place at the program, region, forest, or research station level to identify long-term strategic goals for the asset portfolio. During the data collection phase, each project will respond to criteria to determine whether the affected assets are included in long-term master plans to ensure that selected projects do not contradict any long-term plans. Projects will not be eligible for funding if they are flagged for potential decommissioning.

3. **Regional project management** processes, including environmental assessments, acquisitions, and permits, will remain the responsibility of the regions and forests and will be the primary means of project execution. Information related to project management, such as *whether* assessments (e.g., SHPO, U.S. Department of Housing and Urban Development, Travel Management, and National Environmental Policy Act (NEPA)) have been completed or permits have been acquired, will be used at the national level as part of multiyear planning. Projects that have not completed the planning stage will be deferred to future years in favor of shovel-ready projects.

5.3.4 Exclusions to the Proposed Process

While the CCIP framework exists to optimize the selection of large projects based on benefits to the FS, some types of projects are better handled separately. These exclusions could include minor projects in which the effort to quantify and document project attributes is disproportionate to the size of the project itself,

or decommissioning projects in which assets are eliminated rather than constructed or upgraded. To simplify the management of these unique projects, FS has elected to remove them from the selection process, leaving only capital improvement projects for the optimization model.

All Capital Improvement and Maintenance Projects

Regionally-managed Maintenance Programs

Decommissioning

Nationally-managed Capital Improvement Program

Figure 6: CIM Project Breakdown

Routine Maintenance Projects

Some maintenance projects are too routine or minor to require national prioritization or coordination. Funding will be allocated to each region and research stations for the regular maintenance of assets, prioritized according to asset decisions made in the field. This process continues the field management of minor projects without requiring incorporation into the full national project selection process. Reducing the number of projects that must be prioritized at the national level will simplify the data collection and analysis phases of project prioritization, which will quicken the optimization process itself, leaving fewer project combinations to consider and streamlining operation of the optimization model.

Decommissioning Projects

The Agency has an extensive network of assets types and continues to focus on systematically and methodically consolidating, collocating, and disposing of unnecessary assets as part of its overarching asset management strategy. Retiring assets will reduce the burden of deferred maintenance and free up funding for more critical assets elsewhere. Since 1992, the Agency has disposed of 16,000 buildings,[35] including more than 1,000 since 2007.

The benefits of decommissioning cannot be measured by traditional capital improvement project criteria, as these projects do not directly contribute to the accomplishment of the organization's mission; rather, these projects indirectly contribute to the mission by improving the efficiency of the organization through the removal of burdensome and outdated assets and the retirement of maintenance obligations associated with them. Potential

> **Alignment with FY 18 Omnibus Appropriations Bill Objectives for CCIP**
>
> The Agency will continue to emphasize the identification of **facilities, roads, and other infrastructure that should be disposed of or decommissioned** by assessing decommissioning projects separately from capital improvement projects.

decommissioning projects will be assessed separately from capital improvement projects at the national level and will be selected and approved based on standardized factors such as reduction in deferred maintenance, return on investment, and asset criticality to the mission.

5.3.5   Governance Structure

Successful implementation of a CCIP process that optimizes major capital improvement decisions at the national level will require a solid and transparent governance system. Adequate stakeholder buy-in, clear roles and responsibilities, and a common understanding of the decision-making process will help to ensure the CCIP rollout is successful and the resulting process is sustainable for the long term.

The CCIP process will incorporate a governance structure with three tiers of roles and responsibilities, mirroring the three-stage process detailed in section 5.3.2. The three tiers will form a feedback loop, with the Washington Office (WO) starting and ending the process each year.
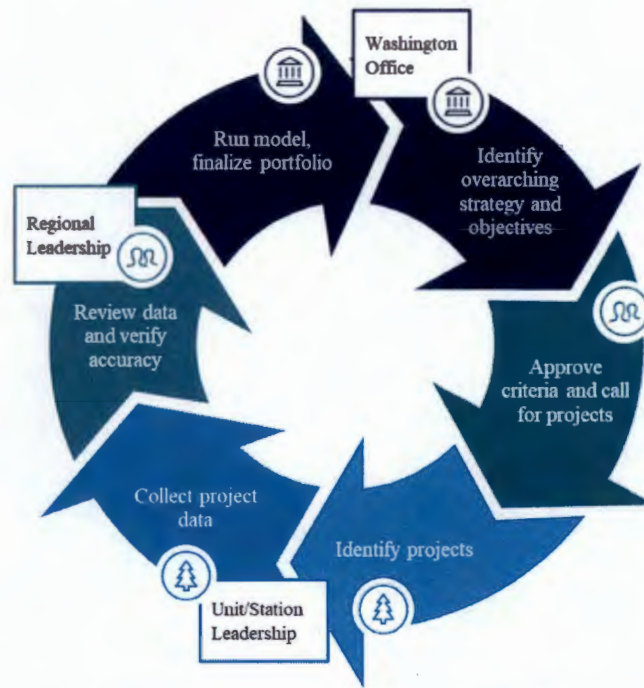
Figure 7: Governance Roles and Responsibilities Feedback Loop

The **Washigton Office (WO)** includes the Asset Mangement Review Board (AMRB), which is composed of the FS chief and deputy chiefs of business operations, NFS, R&D, and state and private forestry services. The AMRB will be the final decision authority for the selection of Capital Improvement Projects (CIPs): they will approve criteria, approve benefit area weights, and approve the final multi-year project list. Prior to project selection, the WO will be responsible for reviewing and identifying the overarching strategic goals that will govern the process. The WO will communicate these goals to regional and forest-level management. To complete the project selection process, the National Program Managers will will be responsible for reviewing projects, running the optimization model, and preparing output for consideration by AMRB.

Regional Leadership will be responsible for reviewing the projects submitted by the units/stations within their respective programs, particularly for data accuracy and completeness. Regional program managers will approve projects submitted by the units/stations, but will not be responsible for project prioritization or selection. They should consolidate overlapping or related projects as appropriate and screen out any projects that fall below the requirements set for National consideration.

Unit/Station Leadership, including engineers, recreation managers, and research stations, will form the third tier. These teams will be responsible for identifying projects using existing processes such as needs assessments, condition assessments, master plans, asset priority indices, and mission criticality measures. Once projects are identified, these teams will collect the requested data, cost estimates, and justification or documentation and respond to programmatic data calls. Following ultimate project selection by the WO, the regional, forest, and research station teams will be responsible for project execution and providing accomplishment reports.

5.4 OPTIMIZATION MODEL DEVELOPMENT

Following the issuance of the CCIP, the optimization model itself will be built around a three-dimensional framework to capture relevant project attributes in a quantitative, data-driven fashion.

5.4.1 Optimization Model Framework

To effectively balance the achievement of organizational objectives within funding constraints and delivery risks associated with individual projects, the proposed optimization model will quantify project attributes against the following three dimensions:

1. **Benefit.** *Quantitative measures of project benefits.*
   This dimension captures the benefit of each project and may include quantitative measures of mission alignment (e.g., a project's support of fire protection and response, timber production, recreation, R&D, environmental protection, and other economic factors), health and safety response (i.e., alleviating acute health or safety risks to employees and to the public), and project asset criticality (i.e., current asset condition or substitutability).

2. **Cost.** *Resource requirements for each project.*
   This dimension measures the resource requirements for each project, including, but not limited to, the monetary cost of each project or the management resources required for each project. Separating this dimension gives the Agency the ability to constrain total portfolio costs to funding amounts and run scenario analysis around changing funding levels.

Taken by themselves, benefit and cost can be compared against each other to create an efficient frontier of portfolio value. This framework allows reoptimization of portfolio value as budgets change, resulting in the highest value combination of projects possible, given any budget. In addition to these two dimensions, FS will assess projects against a third:

3. **Risk and Readiness.** *Quantitative measures of the project readiness or its overall delivery risk.*
   This dimension measures each project's readiness for execution and the delivery risks that may reduce the chances of successful project completion. These attributes do not directly benefit the organization's mission, but still contribute to prioritization or scheduling, and may include planning hurdles that must be cleared for a project to proceed to execution (e.g., acquisition of permits or jurisdictional permission, identification of a project manager, completion of appropriate assessments) or attributes that may reduce the likelihood of successful project delivery (e.g., likelihood of identifying capable contractors, likelihood of awarding a contract, age or fidelity of latest cost estimate).

This separation of dimensions allows the model to develop a multiyear portfolio that:

- Schedules only projects that meet the risk or readiness criteria determined by the organization.
- Maximizes achievement of organizational mission within any given year.

- Constrains the total cost or resource requirements of the portfolio to the level available.

Incorporating readiness criteria allows regional, forest, and research station teams to submit projects to fit organizational needs, rather than projects that are merely ready to be executed. Projects that may not be ready for execution will be deferred to future years. This consideration for readiness will improve the operational efficiency of the regional, forest, and research station teams, preventing them from focusing limited personnel

> **Alignment with FY 18 Omnibus Appropriations Bill Objectives for CCIP**
>
> By incorporating readiness criteria and refining the multi-year schedule of capital projects annually, the Agency will continue to identify and incorporate **future needs for investment to improve the physical infrastructure and health of the national forests**.

and resources on identifying minute details of projects that may be deferred. This will help the organization avoid the planning and design phases of projects that will not be selected for several years.

As part of the CCIP, FS will customize the project attributes within each dimension to best reflect organizational realities. The selection of project attributes is critical, as it becomes the basis for prioritization decisions and the multiyear project schedule. Based on conversations with leadership and feedback from stakeholders, the working group identified draft project benefit, risk, and readiness attributes, some of which are included in the dimensional descriptions above. As discussed in section 5.2, these attributes are supported by surveys sent to regional directors of engineering, recreation, and research, and they will continue to be refined as the implementation of the project selection process continues.

6 IMPLEMENTATION AND NEXT STEPS

The Agency anticipates that the implementation of the CCIP detailed in this document will take place over the next fiscal year in advance of the FY 2021 budget submission. This schedule provides the Agency with time to conduct crucial implementation activities affecting the people, processes, and technology necessary to achieve its goals associated with the CCIP. The following summaries describe key actions for executing the CCIP process based on the notional timeline provided. Organizing these actions into the following workstreams will allow FS to properly resource and manage the associated tasks involved with successful implementation of the CCIP:

- **Process Implementation.** This workstream will cover refinement and implementation of a repeatable planning process, including finalization of prioritization criteria, development of data collection templates and processes, development of the optimization model, and establishment of a governance structure. Successful capital planning and project execution requires increased focus on proper governance that provides consistent and centralized oversight and direction to support of the capital plan. Implementing the right processes will help plan, manage, and deliver CCIP projects with clear definitions of authorities and requirements.

- **Asset Management Integration.** Capital improvement planning is only one component of a robust asset management strategy. The other key aspects in asset management are related to resiliency, reliability, efficiency, and modernization for better results and more sustainable operations. Within this workstream, FS will continue to assess overarching asset management strategies and processes to promote integration between asset management and capital improvement planning, such as portfolio-oriented performance indicators to inform future capital investment decisions.

- **Change Management and Communications.** Assessing the organization's readiness for change, including the impact on staff, is an important prerequisite to any transformation initiative. This workstream will assess the interventions and organizational levers that could promote successful adoption of the new approach through communications and stakeholder engagement. In addition, it is important to develop appropriate training and resources necessary to help staff adapt to changing responsibilities and excel in their new roles.

Activities within these workstreams are broken out in the following implementation road map:
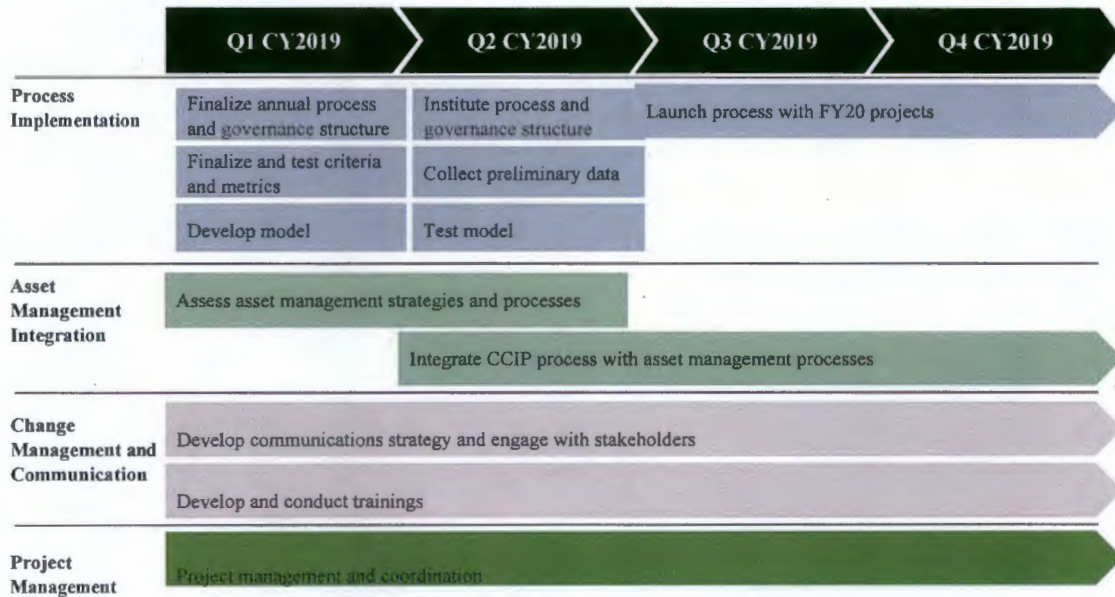

Figure 8: Implementation Road Map

The plan will remain flexible and responsive throughout the implementation process. Following implementation, the Agency will be executing a sustainable, forward-looking CCIP. This will improve the Agency's ability to effectively manage its capital assets in consideration of its mission, the FS chief's focus areas, and infrastructure goals. Additionally, it positions FS to implement a multiyear CCIP process that ensures effective stewardship of NFS lands to meet the needs of current and future generations and honor the fiduciary responsibility to wisely spend the funding it receives.

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