

# Appendix P

## RECREATIONAL DATA

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## Appendix P - Estimated Recreation Impacts, Benefits Foregone and Local Economic Impacts

**A. General:** Recreation impacts (displayed as losses to visitor days) at the Bluestone Lake project as a result of Dam Safety Modification construction activities at the Bluestone Dam starting around the year 2000 have been identified as well as anticipated recreation impacts in the downstream areas and upstream recreation sites associated with Phase 5 construction activities in the stilling basin and upstream consequences (increased recreation site inundation) of being unable to operate the full complement of sluice gates over an approximate ten-year period.

Recreation uses at Bluestone Lake span the entire gamut of uses common to Corps of Engineers reservoirs/lakes including: fishing, boating, camping, picnicking, hunting, water skiing, hiking, bird-watching, sightseeing, playgrounds, vacation cabins (Bluestone State Park), and various types of structured and unstructured field sports and games. Visitation losses at these sites due to direct construction impacts (sites downstream of the dam) or as a result of modified dam operations (at sites upstream of the dam) are described in detail below. Applying unit day values (UDV) prescribed in CECW-P Economic Guidance Memorandum 17-03 dated 25 October 2016 for FY17 to estimated losses in visitor days yields expected recreation benefits foregone and impacts to various categories of visitors. Potential adverse effects on the local economy as a result of lost recreation visitor days have also been considered in this section.

This appendix attempts to capture the recreation losses associated with construction activities starting in 2000 through 2015 (period for which accurate visitation figures are available) and anticipated recreation impacts associated with construction activities associated with Phase 5 in the stilling basin lasting between 2018 and 2033. The upstream and downstream recreation areas visitor day impacts have been addressed separately since construction impacts differ in each case and because a determination has been made by USACE District Counsel that agency responsibilities for mitigating recreation use impacts to downstream areas (operated by the Corps of Engineers) differ from recreation use impacts to upstream areas that are operated and managed by a lessee (WVDNR). Anticipated economic impacts to the local economy have been estimated based upon lost recreation visitor days for both upstream and downstream sites.

**B. Downstream Recreation and Fishing Access:** There are two primary recreation areas downstream of the dam. One area is located on the right descending bank (east bank) commonly referred to as Downstream #1 which includes Hinton City Park, a multitude of day use recreation activities (playing fields and paved courts) and river access across the “beach” for wading to the “catwalk”. Prior to the advent of construction activities in 2000, this site included additional recreation fields and an open space for walking and general play. These areas were significantly impacted by a construction materials laydown area and a concrete batch plant. These sites have generally been unusable to the public since 2000. The 1998 EIS for the Bluestone Dam Safety Modification project anticipated a much shorter construction period and therefore anticipated minimal recreation impacts that could be mitigated at some future date.

The second area is located on the left descending bank commonly referred to as Downstream Site #2 (west bank) consisting of a cantilevered fishing platform allowing ADA-compliant access for fisherman enjoying the sights, sounds and fishing success of turbulent waters immediately below the stilling basin. Generally speaking, areas downstream of the dam are devoted to fishing (platform, wading, small watercraft and bank fishing), baseball, tennis, basketball, picnicking (picnic shelter) general play, birdwatching and sightseeing. A portion of the Downstream #1 area is leased to the City of Hinton whereupon a baseball field and other recreation amenities have been constructed and are operated and maintained by the City. Figure 1 shows the general layout of these various facilities and their geographic relationship to the dam.

In contrast, recreation sites located upstream of the dam designated as: Bluestone State Park, Marina, Bluestone River Launching Ramp (the "Pit"), Bertha Boat Launch and Camping Area, Bull Falls Camping Area, Mouth of Indian Creek Camping Area, Cedar Branch Recreation Area, Shanklin's Ferry Camping area and Glen Lyn Park provide opportunities for access to water sports on Bluestone Lake, Bluestone River and New River as well as camping, picnicking, hunting, swimming, fishing, and sightseeing. There are a number of undesignated boat-access only camping and picnicking sites along the eastern lakeshore as well. These sites were not impacted during the period between 2000 and 2015 except for the Leatherwood Landing area used for construction purposes.



**Figure 1 – Bluestone Dam Downstream Recreation Access Sites**

The proposed Phase 5 construction activities in the stilling basin will have two major effects on recreation resources at the project. First, construction work limits needed to complete proposed construction in the stilling basin will require removal of the cantilevered fishing platform located immediately below the stilling basin weir that extends off the left descending bank (Downstream site #2) below the training wall. There is very limited parking available at this site, but since construction of the cantilevered platform, this site has become a favorite fishing site for many anglers including people who are disabled and/or elderly and small children. Recreation visitor day losses at this site are expected to be total (100% loss when the platform is removed and the access road is closed to be used exclusively for construction vehicles). The Downstream access site #2 be closed to public use throughout the ten year construction period. Statements in the project EIS and design/construction tasks identified in project schedules and costs estimates confirm that this platform and parking area will be restored at this site during completion of spillway modification work. Despite intended restoration of the platform access the site still suffers from a lack of parking, a condition that cannot be easily or inexpensively remedied due to steep topography (adjacent location to elevated Route 20) and the site's location near the toe of the dam and training wall.

The construction work limits will also rule out further use of the wading "catwalk" located underwater immediately downstream of the weir. This is a favorite site for wading anglers wishing to access that productive zone where a natural conveyor of water-borne food and highly oxygenated water attract numerous and large fish to feed. Additionally, loss of access across the so-called "beach" area near the east training wall to the underwater "catwalk" during construction will further restrict fishing below the dam. Construction activities at the east side of the stilling basin will effectively cutoff access to the beach area and catwalk for wading fishermen during most of the construction period.

Of total fishermen use on the right descending bank (Downstream #1) it is estimated (project staff consensus) that approximately 60% of the total fishing use at the Downstream #1 site is attributable to wading fishermen that are accessing the "catwalk". Generally speaking all current fishing use immediately below the dam within 300 feet of the weir will be lost (100% loss) during that ten year period. Fisherman accessing the river from the right descending bank can still wade the river to fish below the construction zone, but the relatively easy access across the "beach" area to the east training wall and catwalk will be replaced by a 300-400 foot trek across uncertain, submerged terrain. It is likely that many fishermen will find other locations in the local area to fish in the interim. It is anticipated that some access to these productive fishing areas may be restored after construction.

The following paragraphs address the downstream recreation impacts that have occurred since the initiation of the Bluestone DSM project beginning in 2000 and the currently proposed construction in the stilling basin identified as Phase 5 of the DSM project. General recreation and fishing have been separated out for individual analysis given the duration of the impacts associated with the Bluestone DSM project and the differences in the significance of the impacts to general recreation and fishing below the dam. The downstream fishing impacts are addressed first.

**C. Downstream Fishing Visitor Day Losses:** *The losses in visitor days for fishing being projected in this section are directly attributable to the Bluestone Lake project itself and are not meant to infer that such losses will affect the general fishing characteristics of the region outside of the project boundaries.*

**Visitor Day Loss Computations:** The section above outlines the range of limitations that will be placed upon fishermen below the dam during construction in the spillway. These limitations will result in migration of a percentage of fisherman to other locations within and outside of the project area. There are well-known, good-quality fishing options (i.e. Sandstone Falls, WV, Narrows, VA, and Greenbrier River, WV) located within the immediate area that can accommodate many of the visitors being relocated from the catwalk and with the exception of disabled and/or elderly fishermen from the cantilever platform site. It is unlikely that dedicated fishermen in the local area will cease fishing altogether, but will migrate to other options as described above.

However, the high quality (Class 1 waters<sup>1</sup>) of the downstream fishing below Bluestone Dam and the overall fishing experience (visual and aesthetic quality of that site) attracts many fisherman from outside of the region who, when this fishing site is restricted during construction, may forego an extended trip to the project area just to fish in alternative sites not unlike sites nearer to their place of residence. These fisherman are likely to choose alternative sites outside of the project area that are of similar quality yet more attractive due to shorter travel distances. Higher travel costs (in terms of time and travel expenditures) and reduced access to the fishing experience below Bluestone Dam will steer a segment of these remote fishing visitors to other locations outside of the region. Estimates from project staff are that approximately 15% of the fisherman using the downstream fishing access are from outside of the region and could chose other options due to the loss of access.

In addition to this potential loss of fisherman from outside of the region, there is another segment of the fishing population that experiences losses that are hard to mitigate for at alternative sites in the region. The disabled, elderly and very young fishing populations have limited access points from which to fish safely either in the New River, the Greenbrier River or Bluestone Lake. The cantilevered fishing platform on the left descending bank near the spillway is a premier fishing location for those in wheelchairs (elderly or young alike), those with physical impairments that limit their ability to wade the river or negotiate steep riverbanks, the elderly who may wish to fish but who have lost the physical ability to reach the water's edge, and the very young fisherpersons (male and female) whose physical abilities aren't yet honed to the rigors of river wading or may be skittish about scrambling down rocky slopes to the water's edge.

These groups will lose a premier access point to the river that cannot be easily replaced. Estimates from the project staff are that approximately 20% to 25% percent of the current fishing population using the cantilevered platform fit one of the categories of either physical disability or limited physical ability whose access to the river would be seriously impeded when existing facilities are removed.<sup>2</sup> Although no estimates are available for the number of disabled and elderly visitors that may be frequenting the Downstream #1 site, US Census data indicates that 21.9% of the Summers County population under the age of 65 has a physical disability and 21.4% of the population is age 65 or older. Therefore It is highly likely that at least 10% of those visiting that site are either disabled or over the age of 65. In either case this population's access to the river's edge is limited to the steps adjacent to the boat slide and for non-ambulatory visitors there is no other access currently.

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<sup>1</sup> Entire lengths or reaches of rivers and streams in the State of West Virginia have been classified by the US Fish and Wildlife Service as being within one or more categories based upon the quality of the fishery, water quality and the environment surrounding the stream. The fishery below the dam was classified by USFWS as a Category 1 Resource fishery in their Planning Aid Letter dated March 2004

<sup>2</sup> Based upon a communication with BLN project staff regarding characteristics of visitors at the cantilever platform.

Projecting potential recreation losses to downstream fishing below Bluestone Dam during the Phase 5 construction begins with compilation of the past 32 years of recorded recreation visitation at Bluestone project. Monthly, and by year raw data was supplied by LRH Operations Division and some data adjustments were made<sup>3</sup> to account for missing data and contractors' traffic into recreation sites when those sites were closed for public use or when contractor traffic effectively tripled normal public visitation into downstream sites. Once the 32 years of record were compiled, monthly mean visitation was computed for both Downstream #1 and Downstream #2 areas. Based upon experienced observation of visitor trends by project personnel, estimates of seasonal fishing use as a percentage of total site use were developed for these two sites.

Since fishing use below Bluestone Dam exhibits a seasonal variation, estimates were made for summer, winter and fall/spring. Given lack of parking and other recreation facilities at the Downstream #2 site, the PDT consensus (confirmed by project staff) was that fishing accounted for at least 90% of visitor days at that site with the occasional sightseer or visitor looking for a restroom (there are no flush-type restroom facilities at that site) represented by the remaining 10% visitor days. Ninety percent usage by fishermen is an all-season percentage.

At the Downstream #1 site where there are other recreation opportunities (baseball, playground, tennis, basketball, sightseeing, etc.), a determination of fishing use as a percentage of total use was defined through coordination with project staff and seasonal observations. Based upon observations of annual use trends by project staff, it was determined that winter use at this site was approximately 70% fishing, summer fishing was approximately 25% of total site use and fall/spring (October/March) fishing accounted for approximately 33% of total visitation. Those percentages were used to derive projected fishing visitor days at the #1 site over a ten year construction period. Not accounted for by current recording methods are numerous fishermen who walk into the Downstream #1 site from the Bellepoint neighborhood (est. population 400). Based upon 32 years of project records, total monthly mean visitation for the Downstream #1 and #2 sites is shown in Table 1. Also shown in Table 1 is estimated fishing use at each site based upon seasonal changes.

Other estimations of visitor days at these two locations were considered for analysis including mean visitation at these two sites during: 1) highest total project use year over 32 years of record, 2) mean visitation during the lowest project visitation year and, 3) visitation at both sites during the highest single-month visitation over 32 years of record. These upper and lower boundaries identified extreme levels of usage found at both downstream areas that could conceivably occur in the absence of the Phase 5 construction activities. In an effort to avoid over or under estimating future use, mean monthly values of visitation calculated over 32 years of record were selected as the most reliable and reasonable basis for projecting future visitation.

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<sup>3</sup> There were gaps in the recreation use data for individual recreation sites. Those gaps were filled by inserting mean values calculated from monthly use data collected five years before and five years after the gap. Also considered in filling in data gaps were the general recreation use trends at the total project during those same time periods.

**Table 1 - Monthly Mean Visitor Days (Total use and Fishing Use)  
at Downstream Sites #1 and #2**

Months	Total Visitor Days at Downstream Site #1	Fishing Use at Downstream Site #1	Total Visitor Days at Downstream Site #2	Fishing Use at Downstream Site #2
January	11,190	7,833	4,268	3,841
February	12,588	8,812	5,180	4,662
March	25,507	8,417	10,079	9,071
April	39,397	9,849	19,050	17,145
May	55,588	13,897	29,562	26,606
June	62,922	15,731	36,558	32,902
July	64,616	16,154	37,388	33,649
August	51,608	12,902	29,467	26,520
September	31,062	7,766	17,880	16,092
October	22,276	7,351	11,097	9,987
November	13,079	9,155	7,092	6,383
December	10,233	7,163	4,675	4,208
Annual Totals	400,066	125,030	212,296	191,066

Mean values of monthly visitor days for both downstream sites could have been used to generally characterize potential recreation losses during construction. However, repeating one mean use value for an entire ten year period (125,030 for Site #1 and 191,066 for Site #2) seemed unrealistic. None of the 32 years of recreation visitation at Bluestone Lake yielded annual totals that changed by less than 100,000 visitors, so a measure of variability was included into the loss calculation. Rather than relying on a theoretical, probabilistic method or measure of variability, past annual recreation use at Bluestone Lake over the 32 year record was investigated for periods of variability within reasonable bounds. That investigation yielded just such a period of variability within realistic boundaries.

A historic period of total project visitation at Bluestone (1989-1998) was identified during which visitation varied by -9% to +9% over a ten year period. This period of visitation was selected to account for externalities such as variable travel costs (fuel prices), national economic trends, seasonal weather anomalies, etc. that could also influence future visitation to the project outside of variable costs of fishing licenses, tackle and bait during that same period. Those factors (see Table 2 below) were applied to annual mean values to add a measure of variability to potential losses based upon actual, historic fluctuations in Bluestone visitation. The modified values for both sites are shown in Table 2.

Loss of the cantilevered fishing platform and parking area at Site #2 during construction would effectively forego projected 1,949,995 fishing visitor days at Site #2 over that ten year period. In addition, loss of access to the “catwalk” below the stilling basin for wading fishermen over that ten years would substantially reduce fishing use at Site #1 by 1,276,041 visitors. Based upon observations of use and project staff experience, it was estimated that fishing use at Site #1 would be reduced by as much as 60% from its current levels due to this dramatic change in river accessibility. A majority of these fishermen will find alternative fishing sites in the general area as discussed above, but fishermen from outside the region (estimated to be about 15%) who would travel to the project just to fish in this renown, high-quality fishery and whose travel distances are much longer (4+ hours) will likely find alternative sites outside of the region.



**Table 2 - Modified Annual Fishing Use Visitation at Downstream Sites #1 and #2**

Years of Construction	Annual Mean Value	Annual Modification Factor	Modified Annual Fishing Use at Downstream Site #1	Annual Mean Value	Annual Modification factor	Modified Annual Fishing Use at Downstream Site #2
1	125,030	0.06221	132,808	191,066	0.06221	202,951
2	125,030	0.02768	128,491	191,066	0.02768	196,354
3	125,030	0.09696	137,152	191,066	0.09696	209,591
4	125,030	0.05497	131,903	191,066	0.05497	201,569
5	125,030	-0.03622	120,502	191,066	-0.03622	184,146
6	125,030	0.02447	128,089	191,066	0.02447	195,741
7	125,030	-0.09197	113,531	191,066	-0.09197	173,494
8	125,030	-0.02401	122,028	191,066	-0.02401	186,479
9	125,030	0.03349	129,218	191,066	0.03349	197,465
10	125,030	0.05830	132,319	191,066	0.05830	202,205
Totals			1,276,041			1,949,995

In an effort to mitigate for these losses to river access and especially for losses associated with disabled and elderly fishing access currently provided by the cantilevered platform on the left descending bank, two mitigation access sites are being considered. The first mitigation site is at the existing Downstream Site #1. The site will feature construction of two sets of concrete steps that will provide access to the waters' edge for ambulatory fishermen and those wishing to wade into the downstream waters to fish. The step design will allow fishermen to either fish standing up or sit in personally provided chairs or on a seat wall. This site will be connected to the existing day-use recreation area that features a public restroom, playground and parking for 129 vehicles. These access sites will be designed and constructed to reduce impacts to existing trees and the river environment. These access sites will be separated from the existing playground area by a security fence to reduce the potential for stray balls and toddlers at the playground entering the site without adult supervision.

The second site is located at the current Bluestone Lake State Park boat launching ramp and will feature multiple level decks connected by an ADA compatible walkway to a parking area. This site will provide ADA accessibility for fishing at the project until the cantilevered platform can be reconstructed at its present location near the stilling basin. The multiple level decks will account for differing pool heights in the lake due to increased pool fluctuations. Additional paving at the boat launching site will assure safe, walkable access for the disabled and/or elderly and youth fishermen to access the lake. Being a part of the State Park area (nearby restrooms) will enhance the quality of this experience for fishermen who are being displaced from the downstream sites.

**D. Estimating Economic Losses for Fishing Access Impacts:** Unit day values (UDV) prescribed in CECW-P Economic Guidance Memorandum 17-03 dated 25 October 2016 provided values for recreation visitor days based upon an assessment of 5 location, facility and aesthetic criteria for each site. Those criteria include: 1) recreation experience (assessment of adjacent/supportive recreation activities), 2) availability of opportunity (assessment of like recreation opportunities within zones around the site in question), 3) carrying capacity (minimum through ultimate facilities that allow full use of the site without harm to surrounding resources), 4) accessibility (quality of road access or any access to the site), and 5) environmental quality (assessment of aesthetic quality of the environment within which the site

is located). Each criterion includes a set of judgment factors that assign a point value (0-30) score to the site based upon quantitative and qualitative factors. These point values can be assigned by planners and operations staff who have a knowledge of the site and its attributes. Summing of the point values provides a total score for each recreation site that can be subsequently converted to estimated dollar values of the recreation experience.

An assessment of the downstream access sites reveals that Downstream Access Site #1 (right descending bank) where the Hinton City Park is located accumulates a higher total point value than the Downstream #2 site due to Site #1's larger parking capacity, flush-type restrooms, high quality playground, paved city street access, high-quality aesthetic surroundings, and athletic fields. This site is also the primary access point for waders to reach the "catwalk". Since the beach and catwalk areas provide access to the highest quality fishing below the dam, Downstream Site #1 scores very high across all 5 criteria. That total point value for Downstream Access Site #1 is 75. The downstream access site #2 has a slightly lower total score due to limited parking, lessor supporting facilities (non-flush toilets) and limited supporting recreation. Its high point values in the evaluation process are a result of its access for disabled/elderly visitors and the high-quality aesthetic experience associated with being perched directly above the overflow weir at the end of the stilling basin. Regardless of these high pints, the Downstream Site #2 accumulates and total point value of 66.

Based upon these total point values, the downstream access site #1 has a value of \$11.02 per visitor day and the Downstream Site #2 has a value of \$10.45 per visitor day. Using these two values the economic impacts of the loss of fishing access due to construction in the stilling basin can be calculated and is shown in Table 3 below.

**Table 3 - Anticipated Project Fishing Use Days Lost and Value of Project Benefits Foregone (10-years)**

Recreation Sites	Projected Total Fishing Visitor Days	Anticipated Project Losses Due to Construction	Unit Day Value for Fishing and Hunting	Total Value of Project Fishing Benefits Foregone
Downstream Site #1	1,276,041	765,624	\$11.02	\$8,437,176
Downstream Site #2	1,949,995	1,949,995	\$10.45	\$20,377,448
Totals	3,201,351	2,709,272		\$28,814,624

The total of \$28.8 million in lost project recreation benefits does not imply that such a loss to fishing use occurs across the entire region. As discussed above, there are other options for quality fishing in the surrounding area where local fishermen can continue to fish while the construction at Bluestone Dam continues. The most affected group would likely be those fishermen who have historically traveled farther distances (4 hours and greater travel time) to fish below Bluestone Dam and who may not choose to fish at alternative sites in the Hinton/Summers County, WV area. These fisherman, who may compose at least 15% of the fishing population below the dam would likely find other alternative fishing sites closer to home and avoid the project area until construction has been completed.

Additionally, an estimate of lost visitor days for disabled, elderly and young fisherman was also calculated based upon the same unit day value figure to determine losses in recreation value to that segment of the local population due to the loss of the cantilever platform at Site #2. At this time, fishing

access for disabled and/or elderly at Site #1 is currently limited to one set of steps by the existing boat slide and perhaps the “beach” area below the dam. The present condition of the riverbank (large stone slope protection material) essentially cuts off access to this portion of the fishing population. Future visitation to Site #1 by this segment of the fishing population in Summers County is likely given the percent of this population segment now visiting Site #2. Those forecasted losses are shown in Table 4.

**Table 4 – Loss of Recreation Visitor Days (Disabled and Elderly Visitors) and Benefits Lost (10-Years)**

Access Sites	Forecasted Disabled/Elderly Fishing Access Visitor Days	Anticipated Losses to Disabled/Elderly Visitor Days	Unit Day Value for Fishing and Hunting	Total Value of Fishing Use lost to Disabled/Elderly visitors
Downstream Site #1	130,164	0 <sup>4</sup>	\$11.06	\$0.00
Downstream Site 32	381,983	381,983	\$10.45	\$3,560,081.00
Totals	512,147	381,983		\$3,560,081.00

### E. Visitor Impacts/Economic Losses to General Recreation Downstream between 2000 and 2015:

Construction activities associated with the Bluestone Dam Safety Modification Project began in 2000 with award of the Phase 1 contract. At that time the Downstream #1 recreation site included a regulation-size and well-equipped little league baseball field and a practice baseball field of a similar size. In addition to the athletic fields, there were tennis and basketball courts, a playground, a rest room and an extensive open play area located between the dam access road and the edge of the New River below the dam. The athletic fields and courts, playground and restroom were part of a leased area operated and maintained by the City of Hinton as a city park. A walking path, still in operation today, borders the river between the Hinton City Park portion of the recreation site and the beach area.

The Downstream #2 site was used as a day-use recreation site with a picnic shelter, parking spaces for 129 cars and restroom facilities. The site was used primarily for picnicking, sightseeing and fishing off the west training wall. Phase 1 of the DSM project effectively closed off most of this site while construction was occurring on the dam face, but a small parking area (8 vehicles) was provided and the cantilevered platform was constructed for fishermen access to the productive waters directly below the weir and baffles in 2004. Phase 5 of the DSM project will effectively close this entire area down for the entire 10 year construction period.

Phase 1 of the DSM project included the siting of a concrete batch plant in the Downstream #1 area between the baseball fields and the dam originally populated by the practice baseball field and the open play space. The batch plant and associated construction equipment has been in operation since that date and remains in place as of this writing. At such time as the batch plant and associated construction facilities are removed, the original project EIS (dated May 1998) states that the site would be restored to its original recreation-related purposes.

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<sup>4</sup> Since access to the river is so limited at Site #1 for disabled/elderly fishermen at this time, there was no estimate of how construction may limit or suspend that access. Loss of the beach access likely limits some access but no estimate of current use of this location by disabled/elderly was available.

Prior to initiation of the Phase 1 contract in 2001, the two recreation sites were heavily visited. Average annual visitation at Site #1 was 468,789 persons and average annual visitation at site #2 was 329,975 persons. In total, these recreation areas below the dam (Downstream area #1 which includes Hinton City Park and Downstream area #2) were, prior to the start of the DSM project two of the most visited sites on the Bluestone Dam project, garnering an average of 789,764 visitors annually. Public access to both of these areas has been compromised by construction activities associated with the DSM project and recreation visitation has been affected. Table 5 shows the levels of visitation that these two sites have entertained since 1984. This data includes all uses including fishing during this period of time and the visitation numbers have been filtered (in cooperation with project staff) to attempt to reduce the influence of contractor, supplier and construction-related traffic into the sites.

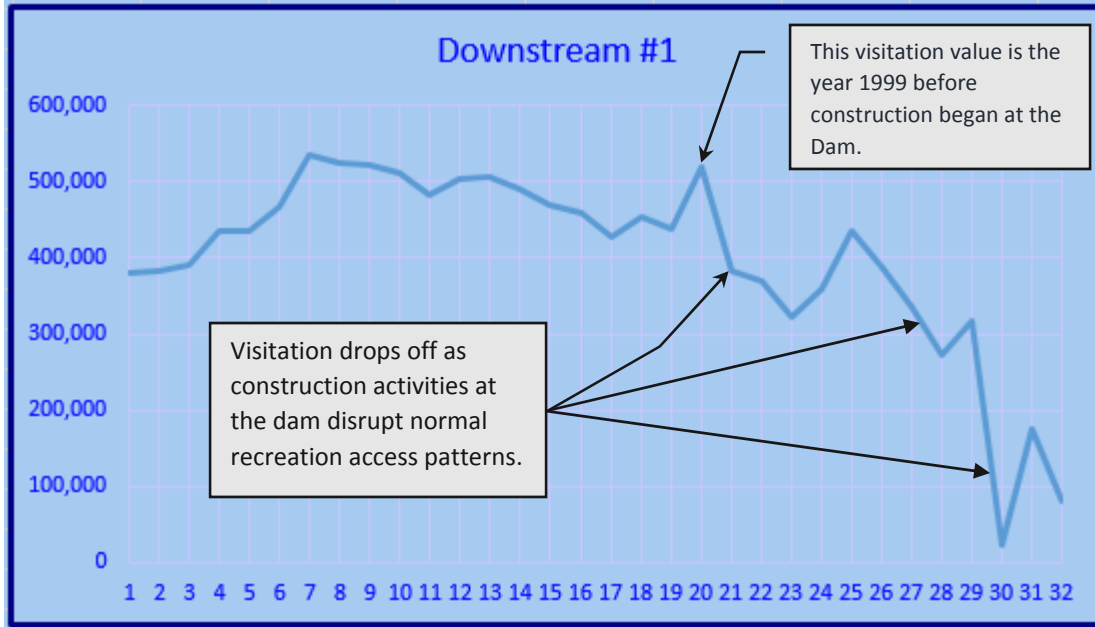
**Table 5 - Visitation at Two Day-use Downstream Sites between 1984 and 2015**

Visitation Years	Recreation Sites		
	Downstream #1	Downstream #2	Total Visitation
1984	379,413	99,469	478,882
1985	382,802	100,357	483,159
1986	390,581	102,396	492,977
1987	434,557	351,573	786,130
1988	435,954	346,744	782,698
1989	467,339	364,674	832,013
1990	536,423	373,031	909,454
1991	524,596	405,706	930,302
1992	523,287	361,374	884,661
1993	510,538	410,873	921,411
1994	484,089	400,583	884,672
1995	503,903	381,297	885,200
1996	506,861	340,876	847,737
1997	491,146	350,875	842,021
1998	469,592	372,895	842,487
1999	459,537	421,869	881,406
2000	428,420	221,095	649,515

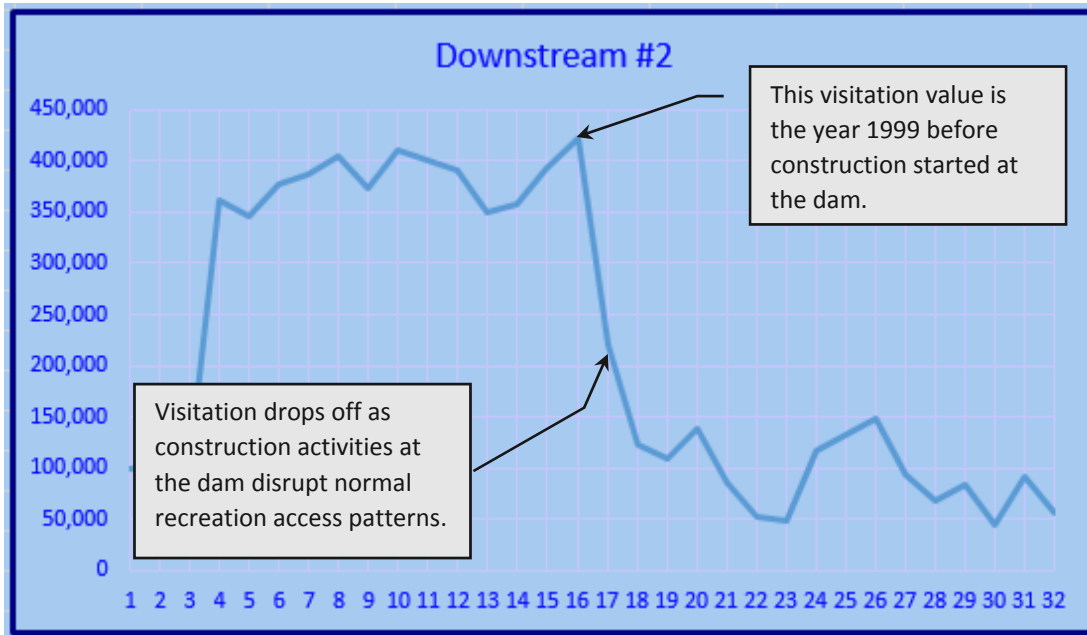
2001	453,032	121,983	575,015
2002	439,008	108,053	547,061
2003	519,030	137,962	656,992
2004	381,706	85,930	467,636
2005	369,995	52,110	422,105
2006	321,600	47,403	369,003
2007	358,969	117,270	476,239
2008	436,466	133,029	569,495
2009	389,139	147,720	536,859
2010	336,273	92,377	428,650
2011	271,627	67,583	339,210
2012	317,076	83,984	401,060
2013	23,611	44,533	68,144
2014	176,345	91,214	267,559
2015	79,209	56,657	135,866
Totals	12,802,124	6,793,495	19,595,619

As the table shows, both sites were heavily used between 1984 and 1999, but as construction activities at the dam were initiated, access to the two sites became problematic and visitation began to drop off. Site # 1 shows some changes in visitation after construction begins, but that drop is especially acute for Site #2. These changes are better observed in graphic form shown as line graphs in Figures 2 and 3. Figure 2 shows the annual visitation at Site #1 between 1984 and 2015 and Figure 3 shows the annual visitation at Site #2 during the same time period.

Visitation at Site #1 drops off and becomes more erratic as sporadic construction activities effect recreation access to the dam and other areas. Special events at the Little League Baseball Field and fluctuations in downstream outflows that may affect fishing use may account for some of the erratic visitation numbers indicated on the graph. Visitation at Site #2 drops off precipitously after construction activities limit access to the site and several facilities (picnic shelter and flush-type restrooms) on that site are closed to the public.



**Figure 2 - Downstream #1 Recreation Site Visitation (1984-2015)**



**Figure 3 - Downstream #2 Recreation Site Visitation (1984-2015)**

Using the average annual visitation for both sites (prior to 2000) and comparing that to the actual visitation after the start of construction provides a measure of the impacts to the recreation sites due to restricted access and loss of facilities and open space. Table 6 shows the actual recorded visitation, the average annual visitation prior to 2000 and the impact in lost visitor days.

**Table 6 - Estimated Impacts to Visitation (Sites #1 and #2) Due to Restricted Site Access**

Year	Actual Annual Recorded Visitation		Average Annual Visitation Prior to 2000		Lost Visitor Days Due to Construction		Total Loss both Sites
	Site #1	Site #2	Site #1	Site #2	Site # 1	Site #2	
2000	428,420	221,095	468,789	329,975	40,369	108,880	149,249
2001	453,032	121,983	468,789	329,975	15,757	207,992	223,749
2002	439,008	108,053	468,789	329,975	29,781	221,922	251,703
2003	519,030	137,962	468,789	329,975	-50,241	192,013	141,772
2004	381,706	85,930	468,789	329,975	87,083	244,045	331,128
2005	369,995	52,110	468,789	329,975	98,794	277,865	376,659
2006	321,600	47,403	468,789	329,975	147,189	282,572	429,761
2007	358,969	117,270	468,789	329,975	109,820	212,705	322,525
2008	435,466	133,029	468,789	329,975	33,323	196,946	230,269
2009	389,139	147,720	468,789	329,975	79,650	182,255	261,905
2010	336,273	92,377	468,789	329,975	132,516	237,598	370,114
2011	271,627	67,583	468,789	329,975	197,162	262,392	459,554
2012	317,076	83,984	468,789	329,975	151,713	245,991	397,704
2013	23,611	44,533	468,789	329,975	445,178	285,442	730,620
2014	176,345	91,214	468,789	329,975	292,444	238,761	531,205
2015	79,209	56,657	468,789	329,975	389,580	273,318	662,898
Totals	5,301,506	1,608,903	7,500,624	5,279,600	2,200,118	3,670,697	5,870,815

As the table shows, total visitation losses to general recreation downstream of the dam since the year 2000 have been substantial (estimated 5.8 million visitor days lost between the year 2000 and 2015) and represents a 29.3% loss in visitor days at site #1 and a 69.5% loss in visitor days for site #2. Using a visitor day rate for general recreation of \$10.15 for Site #1 and a visitor day rate of \$9.45 for site #2, these losses have amounted to over \$22,331,198 for site #1 and \$34,688,087 for site #2. Opportunities to mitigate for those losses could include restoration of lost recreation facilities/resources at both Site #1 and Site #2 when construction of the Dam Safety Project features have been completed. Additional losses due to construction at the dam site are likely to occur through Phase 5 and any additional construction activities at the dam. Additional losses should be monitored by the District to determine what the full impact of losses might be in future years.

#### F. Recreation Sites Upstream of the Dam:

As briefly described above and in other sections of the SEIS there is an array of recreation sites and facilities located adjacent to the conservation pool and upstream on New River and Bluestone River that satisfy a broad array of local and regional recreation needs and pursuits. Recreation sites located upstream of the dam include: Bluestone State Park, Marina, Bluestone River Launching Ramp (the “Pit”), Bertha Boat Launch and Camping Area, Bull Falls Camping Area, Mouth of Indian Creek Camping Area, Cedar Branch Recreation Area, Shanklin’s Ferry Camping area and Glen Lyn Park. These sites generate a substantial part of total visitation to the project and account for the majority of recreation benefits associated with the project. There are other components of project visitation such as hunting whose pursuit on project lands does not necessarily require a visitor to enter a recreation site and be accounted for by vehicle-actuated counters. Hunters may enter government property from an unlimited

number of locations along un-fenced government property lines and legally take game without being accounted for in visitor day records.

The sites named above (except for Glen Lyn Park) are operated and maintained by WVDNR through a license agreement with the Corps or as third-party concessionaires (Marina operator). Under normal operations, several of these sites are inundated each year by higher pools associated with flooding events on New River. Fortunately, under normal operation of the dam with all 16 sluice gates available, the frequency of filling, elevations of pools and duration of inundation can be reduced to lessen impacts on recreation sites and natural resources that support the project's visual quality and attract recreationists. The current number of days out of each year when pool rises above elevation 1410 (conservation pool) as a result of flood storage is 18 days. Minimizing impacts due to inundation at these sites has supported the project's sustained visitor days since its initial operation.

Loss of half of the 16 sluice gates during construction in the stilling basin (half of the stilling basin is being rehabilitated at a time) means that over a ten year construction period the dam will be operated to maintain pool levels using only 8 sluice gates. Given the size of the watershed above Bluestone Lake (4,565 square miles) and past variability of seasonal inflows into the pool, it is highly likely that pool levels in the lake will rise more frequently and for longer durations when being operated with 8 sluice gates. The current estimation of days when the lake would be above conservation pool elevation (1410) using just 8 sluice gates is 54 days for each of the ten years during construction. This change generally represents a three-fold increase (18 days to 54 days) in number of days the lake elevation may be above the conservation pool elevation (1410).

This combination of greater frequency of filling, higher pools and longer duration could have significant effects on recreation sites that are located near (with respect to pool elevation) the summer (1410) and winter (1406) pool elevations. Recreation sites described above are arranged along the shorelines of Bluestone Lake and banks of New River upstream of the extent of the summer pool. Those effects include total or partial inundation of recreation sites at various times of the year, increased lake shoreline and site erosion, deposition of water-borne silt and woody debris, potential ice damages, temporary loss of facilities (bathrooms, potable water supply, drainage structures, and bridges) and adverse impacts to site vegetation.

Higher pools in winter months would likely have less impact when vegetation is dormant (except for inundated evergreens and potential ice damage to tree trunks) than higher pools occurring in spring and summer. Added to the site downtime during inundation when no use can be permitted, each inundation episode at recreation sites will be followed by a period of maintenance to clear debris and silt and repair whatever facilities have been damaged by high water. This "clean-up and repair" time could add several days to a week to the duration a recreation area would be closed (clean-up time is determined by duration and depth of inundation) for public use each time the pool rises above a critical elevation during a projected ten year construction period.

In order to determine the elevation and frequency of inundation for each recreation site, elevations for each recreation site were derived from detailed project mapping and estimates of percentage of site inundation leading to full closure were coordinated with BLN project staff and WVDNR (project lands licensee). In some cases a recreation area may not be inundated but the access road into the site or an access bridge over an inundated tributary may be blocked leading to site closure. In several cases the site camping area may not be inundated but the boat launching ramp (i.e. Bertha boat ramp and



campground) has been inundated to the extent that it is unsafe for launching. Although the site is available for camping use, some visitors may stay away due to loss of safe lake access. In this analysis, inundation of the campground (not just the boat ramp) was the trigger for accumulating visitor day losses.

Annual lake elevation exceedance tables (monthly estimates) were generated by District H&H staff for the current condition (16 sluice gates operating) and projected condition (8 sluice gates operating) during the construction period. As an example, Figures 4 and 5 show elevation exceedance tables for the boat launching ramp located at the mouth of Bluestone River commonly referred to as the “Pit”. Figure 1 shows the exceedance table when the dam is operating with all 16 sluice gates in operation and the red zone indicates when pool elevations have been historically above the recreation site elevation. Figure 2 shows the exceedance table when the dam would be operated with just 8 sluice gates and the red zone indicates when pool elevations would exceed the surface elevation of the recreation site.

The two figures, when compared graphically (next page), show that for the “Pit” Launching Site the months of February through May during any year of the ten year construction period, when only 8 sluice gates are in operation, the risk of the site being inundated (red zones) are much greater – nearly three times greater during March (10% exceedance vs. 30% exceedance) than would be experienced under normal operating conditions. A similar seasonal pattern of exceedance (February through May) leading to site inundation is indicated for each upstream recreation site (with the exception of the Glen Lyn Park Site).

Pit launching area current risk - 16 sluice gates												
Exceedance Interval	Months											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Elevation In Feet											
0.1	1,491	1,478	1,488	1,503	1,450	1,449	1,421	1,424	1,448	1,439	1,460	1,446
0.2	1,483	1,473	1,485	1,494	1,447	1,445	1,418	1,418	1,442	1,431	1,451	1,444
0.5	1,466	1,466	1,479	1,479	1,435	1,428	1,412	1,412	1,423	1,420	1,436	1,442
1	1,446	1,446	1,470	1,459	1,425	1,417	1,411	1,411	1,413	1,413	1,416	1,430
2	1,428	1,429	1,452	1,434	1,418	1,411	1,411	1,411	1,411	1,411	1,412	1,417
5	1,413	1,415	1,433	1,418	1,411	1,411	1,411	1,411	1,411	1,411	1,411	1,411
10	1,410	1,410	1,415	1,411	1,411	1,411	1,411	1,411	1,411	1,411	1,411	1,410
15	1,409	1,409	1,410	1,411	1,411	1,411	1,411	1,411	1,411	1,411	1,411	1,409
20	1,408	1,408	1,409	1,411	1,411	1,411	1,411	1,411	1,411	1,411	1,411	1,409
30	1,407	1,407	1,407	1,410	1,410	1,411	1,411	1,411	1,411	1,410	1,410	1,408
40	1,407	1,407	1,407	1,410	1,410	1,410	1,410	1,410	1,410	1,410	1,410	1,407
50	1,407	1,407	1,407	1,410	1,410	1,410	1,410	1,410	1,410	1,410	1,410	1,407
60	1,406	1,406	1,407	1,410	1,410	1,410	1,410	1,410	1,410	1,410	1,410	1,407
70	1,406	1,406	1,406	1,409	1,410	1,410	1,410	1,410	1,410	1,409	1,409	1,406
80	1,406	1,406	1,406	1,408	1,409	1,409	1,409	1,409	1,409	1,409	1,408	1,406
85	1,406	1,406	1,406	1,407	1,409	1,409	1,409	1,409	1,409	1,409	1,407	1,406
90	1,406	1,406	1,406	1,406	1,409	1,408	1,409	1,409	1,409	1,408	1,407	1,406
95	1,405	1,405	1,405	1,406	1,407	1,407	1,408	1,408	1,408	1,405	1,404	1,404
98	1,402	1,404	1,404	1,402	1,402	1,402	1,404	1,407	1,406	1,402	1,402	1,402
99	1,398	1,401	1,398	1,401	1,402	1,401	1,401	1,401	1,402	1,399	1,401	1,401
99.5	1,397	1,398	1,396	1,401	1,401	1,401	1,400	1,400	1,401	1,399	1,400	1,399
99.8	1,396	1,396	1,395	1,399	1,400	1,400	1,400	1,399	1,400	1,398	1,399	1,398
99.9	1,396	1,396	1,395	1,399	1,400	1,400	1,399	1,399	1,400	1,398	1,399	1,397

Figure 4 – Inundation Risk at the Pit Launching Site with 16 sluice gates operating

Pit launching ramp area future risk - 8 sluice gates												
Exceedance Interval	Months											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Elevation (Feet)											
0.1	1,494	1,483	1,499	1,501	1,475	1,464	1,435	1,437	1,452	1,455	1,469	1,454
0.2	1,485	1,478	1,493	1,493	1,463	1,460	1,432	1,431	1,449	1,449	1,467	1,450
0.5	1,470	1,476	1,485	1,490	1,457	1,456	1,427	1,423	1,441	1,442	1,456	1,445
1	1,463	1,470	1,481	1,479	1,452	1,441	1,416	1,418	1,431	1,436	1,436	1,438
2	1,441	1,451	1,468	1,459	1,439	1,432	1,410	1,410	1,415	1,420	1,421	1,429
5	1,425	1,437	1,457	1,444	1,427	1,416	1,410	1,410	1,410	1,411	1,413	1,419
10	1,415	1,425	1,440	1,430	1,417	1,410	1,410	1,410	1,410	1,410	1,410	1,412
15	1,411	1,419	1,427	1,423	1,412	1,410	1,410	1,410	1,410	1,410	1,410	1,408
20	1,408	1,414	1,420	1,417	1,410	1,410	1,410	1,410	1,410	1,410	1,410	1,406
30	1,406	1,408	1,412	1,410	1,410	1,410	1,410	1,410	1,410	1,410	1,410	1,406
40	1,406	1,406	1,408	1,410	1,410	1,410	1,410	1,410	1,410	1,410	1,410	1,406
50	1,406	1,406	1,406	1,410	1,410	1,410	1,410	1,410	1,410	1,410	1,410	1,406
60	1,406	1,406	1,406	1,410	1,410	1,410	1,410	1,410	1,410	1,410	1,410	1,406
70	1,406	1,406	1,406	1,410	1,410	1,410	1,410	1,410	1,410	1,410	1,410	1,406
80	1,406	1,406	1,406	1,409	1,410	1,410	1,410	1,410	1,410	1,410	1,410	1,406
85	1,406	1,406	1,406	1,408	1,410	1,410	1,410	1,410	1,410	1,410	1,410	1,406
90	1,406	1,406	1,406	1,408	1,410	1,410	1,410	1,410	1,410	1,410	1,410	1,406
95	1,406	1,406	1,406	1,407	1,410	1,410	1,410	1,410	1,410	1,410	1,410	1,406
98	1,406	1,406	1,406	1,406	1,410	1,410	1,410	1,410	1,410	1,410	1,406	1,406
99	1,406	1,406	1,406	1,406	1,410	1,410	1,410	1,410	1,410	1,410	1,406	1,406
99.5	1,406	1,406	1,406	1,406	1,410	1,410	1,410	1,410	1,410	1,410	1,406	1,406
99.8	1,405	1,405	1,404	1,406	1,410	1,410	1,410	1,410	1,410	1,410	1,406	1,402
99.9	1,404	1,402	1,404	1,404	1,404	1,409	1,407	1,409	1,406	1,409	1,401	1,400

Figure 5 – Inundation Risk at the Pit Launching Site with 8 sluice gates operating

Data from these tables was matched with known elevations at various upstream recreation sites to determine the frequency at which higher pools would inundate sites or access roads resulting in site closures. Comparison of existing conditions with projected conditions indicated the expected number of days for each month that each recreation site would be inundated due to changes in dam operation. Additional days were added to each of those months showing the greatest frequency and depth of inundation (spring months) to account for increased future maintenance (clearing debris and silt and making necessary repairs) to restore sites for public use. The resulting days of lost annual use were projected for the ten years of construction and applied to daily use rates for each recreation site. Table 6 shows results of this analysis. Yellow highlighted cells were used for calculations in Table 7 below.

**Table 7 - Estimated Days Lost due to Inundation of Recreation Sites<sup>5</sup>**

Recreation Sites	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
<b>Launching Ramp "Pit"</b>												
Mean Annual Use	2,263	2,212	5,549	6,720	7,936	9,480	12,338	9,145	5,760	5,766	4,495	3,069
Daily Use	73	89	179	224	256	316	398	295	192	186	145	99
Days site inundated/yr <sup>6</sup>	4.1	6.6	7.2	7.0	4.1	1.5	.31	.31	.6	.62	1.5	1.55
Total days site lost for 10 yrs.	41.0	66.0	72.0	70.0	41.0	15.0	3.1	3.1	6.0	6.2	15.0	15.5
Total use loss for 10yrs	2,976	5,903	12,894	15,695	10,476	4,733	1,234	915	1,155	1,153	2,168	1,528
<b>Marina</b>	The marina is only operated between April 15 <sup>th</sup> and October 15 <sup>th</sup> each year.											
Mean Annual Use	0	0	0	3,000	7,936	9,480	12,338	9,145	5,760	1,860	0	0
Daily Use	0	0	0	100	256	316	398	295	192	60	0	0
Days site inundated/yr.	0	0	0	7.0	4.1	1.5	.31	.31	.31	.62	0	0
Total days site lost for 10 yrs.	0	0	0	70.0	41.0	15.0	3.1	3.1	3.1	6.2	0	0
Total use loss for 10yrs	0	0	0	7,000	10,476	4,733	1,234	915	597	372	0	0
<b>Bertha</b>												
Mean Annual Use	1,133	1,205	2,354	6,548	9,870	11,276	12,309	9,680	5,702	5,573	3,076	2,227
Daily Use	37	43	76	218	318	376	397	312	190	99	74	48
Days site inundated/yr.	.62	2.4	4.1	4.0	1.62	1.6	.06	.06	.30	.31	.30	.31
Total days site lost for 10 yrs.	6.2	24.0	41.0	40.0	16.2	16.0	.62	.62	3.0	3.1	3.0	3.1
Total use loss for 10yrs	227	1,033	3,114	8,730	5,158	6,014	246	193	570	308	222	150
<b>Bluestone State Park</b>												
Mean Annual Use	3,763	4,445	9,217	12,266	15,813	18,902	24,700	18,322	11,575	10,305	7,096	5,065
Daily Use	122	149	297	408	511	631	796	591	385	332	241	164
Days site	.31	1.56	2.55	2.5	1.31	1.15	0	0	.06	.16	.15	.15

<sup>5</sup> Estimation of total recreation use losses over 10 years may not match due to rounding of decimal figures.

<sup>6</sup> Days lost per year are based upon annual pool exceedance interval tables for each recreation site.

inundated/yr.												
Total days site lost for 10 yrs.	3.1	15.6	25.5	25.0	13.1	11.5	0	0	.6	1.55	1.5	1.5
Total use loss for 10yrs	379	2,322	7,578	10,211	6,695	7,257	0	0	231	515	361	246
<b>Bluestone Con. Center</b>	The Bluestone Conference Center is located at an elevation above the Bluestone Lake pool levels such that no facilities would be inundated or effected by the pool rises.											
Mean Annual Use	748	857	1,710	5,044	8,362	9,216	10,523	8,131	4,257	4,502	2,526	1,689
Daily Use	24	31	55	162	269	307	339	262	142	145	84	54
Days site inundated/yr.	0	0	0	0	0	0	0	0	0	0	0	0
Total days site lost for 10 yrs.	0	0	0	0	0	0	0	0	0	0	0	0
Total use loss for 10yrs	0	0	0	0	0	0	0	0	0	0	0	0
<b>Bull Falls</b>												
Mean Annual Use	794	792	1,568	4,463	6,551	7,056	7,912	6,366	3,487	3,647	2,162	1,587
Daily Use	26	28	51	149	211	235	255	205	116	70	53	33
Days site inundated/yr.	2.55	3.8	7.2	5.5	2.55	.6	.16	.16	.3	.62	.60	1.55
Total days site lost for 10 yrs.	25.5	38.0	72.0	55.0	25.5	6.0	1.55	1.55	3.0	6.2	6.0	15.5
Total use loss for 10yrs	653	1,075	3,641	8,182	5,389	1,411	395	318	349	432	317	510
<b>Cedar Branch</b>												
Mean Annual Use	1,008	936	1,699	4,729	7,381	8,300	8,883	6,846	3,374	2,162	1,587	1,021
Daily Use	33	33	55	158	238	277	287	221	112	70	53	35
Days site inundated/yr.	1.62	2.4	4.1	2.5	1.62	.30	.03	.03	.15	.31	.30	.31
Total days site lost for 10 yrs.	16.2	24.0	41.0	25.0	16.2	3.0	.3	.31	1.5	3.1	3.0	3.1
Total use loss for 10yrs	527	803	2,248	3,941	3,857	830	86	68	169	217	158	109
<b>Mouth of Indian Creek</b>												
Mean Annual Use	2,212	2,539	4,843	12,983	19,977	23,046	24,267	19,112	9,812	11,025	6,354	4,289
Daily Use	71	91	156	433	644	768	789	617	327	205	143	86
Days site inundated/yr.	4.1	6.6	7.2	7.0	4.1	1.5	.31	.31	.60	.62	.60	1.55
Total days site lost for 10 yrs.	41.0	66.0	72.0	70.0	41.0	15.0	3.1	3.1	6.0	6.2	6.0	15.5
Total use loss for 10yrs	2,925	5,985	11,248	30,293	26,422	11,523	2,446	1,911	1,962	1,271	857	1,332
<b>Shanklin's Ferry</b>												
Mean Annual Use	1,191	1,226	2,454	6,897	10,367	12,177	13,530	10,392	4,860	5,844	3,234	2,257
Daily Use	38	44	79	230	334	406	436	335	162	104	75	50
Days site inundated/yr.	1.31	1.28	2.55	1.6	1.15	.06	0	0	0	0	.06	0
Total days site lost for 10 yrs.	13.1	12.8	25.5	16.0	11.5	.6	0	0	0	0	.60	0
Total use loss for 10yrs	503	561	2,019	3,679	3,846	244	0	0	0	0	45	0

<b>Glen Lyn Park</b>	Glen Lyn Park boat ramp is located at elevation 1506 and all day use recreation facilities are located above that elevation; no anticipated pool rises due to construction approach that 1506 elevation.											
Mean Annual Use	3,375	3,751	7,270	20,563	33,686	36,533	39,485	30,679	14,769	17,402	8,773	5,893
Daily Use	109	134	235	685	1087	1218	1274	990	492	283	196	130
Days site inundated/yr.	0	0	0	0	0	0	0	0	0	0	0	0
Total days site lost for 10 yrs.	0	0	0	0	0	0	0	0	0	0	0	0
Total use loss for 10yrs	0	0	0	0	0	0	0	0	0	0	0	0

Generally speaking the impact of losing 8 sluice gates for maintaining lake pool levels appears to be greatest at upstream sites in late winter through spring months (February – May) when the recreation season is normally just beginning (an adverse impact on vegetation resources that support the visual quality of the recreation resource – see below). Fortunately, forecasted inundation impacts appear to subside during the height of the summer recreation season (June – August) for those same sites. Likewise, impacts are greatest at recreation sites whose ground surface elevations are relatively close to summer (1410) and winter (1406) pool elevations and whose location is immediately on the lake shoreline. Due to its location far upstream from the dam, Glen Lyn Park recreation site is not impacted by any inundation scenarios shown in the pool exceedance tables. Similarly, due to its location far from the dam and on New River, Shanklin’s Ferry isn’t affected as much by projected inundation as other sites in the pool area.

Increases in inundation frequency and duration at upstream recreation sites do result in losses to recreation use and project benefits at the project. Using daily visitation figures at each recreation site (see Table 5 above) and estimated days of inundation from elevation exceedance figures above, losses to recreation visitor days can be derived and evaluated. Percent of visitation by use types (general recreation vs. hunting and fishing) were estimated for each recreation site by month based upon observations of those visitors and past use surveys. Intuitively, visitation and uses change at sites based upon weather conditions (seasonal air and water temperatures), hunting and fishing seasons, and annual vacation times (school summer vacation). It was assumed during the evaluation of potential future visitor day losses that the current monthly distributions of use (general recreation versus hunting and fishing) for each recreation site would remain similar during the ten year construction period.

As an example of the recreation loss calculation, Table 8 shows one month (April) of twelve months that were analyzed for each recreation area. Daily site use figures (column A) were extracted from Table 7 (yellow highlighted cells) and were projected over the ten year construction period to arrive at total expected use (column B). The days recreation sites were lost per year due to higher pool elevations were extracted from Figure 2 for each month (column C) and projected over the same ten year period (column D). Visitor days lost over ten years (column E) were distributed by percentage between expected use types (general recreation (column G) and hunting and fishing (column J) thus arriving at visitor days lost by use type and benefits foregone (columns H and K). Visitor days lost were also

deducted from expected use (column B) without pool raises to arrive at the modified total use figures in column F. Modified levels of expected site use over ten years by use type are shown in columns I and L.<sup>7</sup>

**Table 8 - Example of Expected Value of Recreation Benefits Foregone During Phase 5 Construction<sup>8</sup>**

	April												
	A	B	C	D	E	F	G	H	I	J	K	L	
Bluestone Lake Recreation Sites	Daily site use	10 years visitation over 3,652 days	Days site lost/yr due to higher pools	Days site lost over 10 years	User days lost over 10 years	Modified total use over 10 years	GR	Benefits foregone	Recreation site use by type for 10-years	HF	Benefits foregone	Recreation site use by type for 10-years	
PIT BOAT LAUNCH RAMP	224.2	818,850	7.0	70.0	15,695	803,155	0.4	\$56,378	321,262	0.6	\$93,231	481,893	
MARINA	100.0	365,200	7.0	70.0	7,000	358,200	0.4	\$25,144	143,280	0.6	\$41,580	214,920	
BERTHA	218.3	797,093	4.0	40.0	8,730	788,362	0.4	\$31,360	315,345	0.6	\$51,859	473,017	
BLUESTONE STATE PARK	408.4	1,491,621	2.50	25.00	10,211	1,481,410	0.5	\$45,847	740,705	0.5	\$50,544	740,705	
BULL FALLS	148.8	543,259	5.50	55.00	8,182	535,078	0.4	\$29,388	214,031	0.6	\$48,599	321,047	
CEDAR BRANCH	157.6	575,640	2.50	25.00	3,941	571,699	0.4	\$14,155	228,680	0.6	\$23,407	343,020	
MOUTH OF INDIAN CREEK	432.8	1,580,449	7.00	70.00	30,293	1,550,156	0.5	\$136,017	775,078	0.5	\$149,952	775,078	
SHANKLIN'S FERRY	229.9	839,652	1.60	16.00	3,679	835,973	0.4	\$13,214	334,389	0.6	\$21,851	501,584	
TOWN PARK - GLEN LYN	685.4	2,503,188	0.00	0.00	0	2,503,188	0.5	\$0	1,251,594	0.5	\$0	1,251,594	
	2,605.4	9,514,952	37.1	371.0	87,731	9,427,221		\$351,503	4,324,364		\$481,023	5,102,857	

Unit day values developed by PDT members using the appropriate USACE guidance discussed above were used to estimate benefits foregone due to occurrence of higher and more frequent pools. Those unit day values were \$9.90 for hunting and fishing use days and \$8.98 for general recreation use days (picnicking, camping, sightseeing, hiking, boating, etc.). Comparing visitor day values lost with current use values arrived at an estimated total visitor day loss of 292,682 visitors over ten years. Those visitor days are valued at \$2,759,293. Table 9 shows visitors days lost and benefits foregone by recreation site.

**Table 9 - Expected Visitor Days Lost and Recreation Benefits Foregone by Recreation Site**

Recreation Sites	Estimated Visitor Days Lost - Ten Years	Estimated Recreation Benefits Foregone - Ten Years
Pit Boat Launching Site	60,832	\$578,704
Marina	25,328	\$230,670
Bertha	25,966	\$245,645
Bluestone State Park	35,796	\$336,291
Bull Falls	22,674	\$215,730
Cedar Branch	13,013	\$123,150
Mouth of Indian Creek	98,177	\$925,996

<sup>7</sup> A sensitivity analysis was prepared to ascertain what effects applying the 1989-1998 variations in mean annual visitor use (applied for the downstream sites) may have upon the total recreation impacts upstream. Total impact on projected visitation was under 14,000 visitors and therefore the annual mean without any variation was applied across all recreation use areas.

<sup>8</sup> Tables such as this example for the month of April were created for each upstream recreation site to determine the extent of impacts to visitation over the anticipated 10 year construction period.

Shanklins Ferry	10,896	\$103,112
Glen Lyn Park	0	0
Total	292,682	\$2,759,293

**G. Summary of Recreation Visitor Day Losses and Recreation Benefits Foregone:** As noted above, downstream and upstream recreation sites are being addressed separately for purposes of addressing mitigation needs. Projected downstream losses to recreation visitor days are a result of direct and indirect construction impacts to fishermen that traditionally have had access to the “beach” area and “catwalk” below the stilling basin and elimination of the cantilevered fishing platform on the left descending bank (Downstream Site #2). Since these sites are largely operated and maintained by Corps of Engineers staff, there is a need to mitigate for any losses of public access for fishing and other downstream uses impacted during construction. As Table 3 shows there could be upwards of 2.7 million visitor days lost due to construction activities in the downstream area amounting to an estimated loss of \$28.8 million in recreation benefits. As state earlier, these losses are attributable to the project itself and are not a reflection of losses to overall fishing in the region. Other good-quality fishing options are available and the majority of fishermen displaced by the construction activities will either continue to fish below the dam by wading into the river from the right descending bank below the construction zone or find suitable alternative fishing sites in the local area. Fishermen who traveled longer distances (4+ hours) to fish at this high-quality site will likely suspend their use until the construction is over in favor of closer alternatives. Loss of access for the disabled and/or elderly and youth fisherman who used the cantilever platform at Site #2 will need to be mitigated. Mitigation options being considered include an ADA compliant site on the right descending bank adjacent to the existing Hinton City Park area below the dam and at the existing Bluestone State Park boat launching ramp. Both sites will provide safe and convenient access for all fishermen (including disabled and/or elderly and youth) at varying levels of outflow and lake level both during and after construction.

Another category of losses to downstream recreation addresses the losses to all day use recreation downstream at both Site #1 and Site #2 (including fishing use) over the period between 2000 and 2015. Major construction activities under the Dam Safety Modification project began in 2000 resulting in restrictions to access at both sites. Table 6 shows the impacts to visitor days as a result of restrictions to access at the two sites. These losses amount to an estimated 2,200,118 visitors for Site #1 and 3,670,697 visitors for Site #2. These losses represent a 29.3% loss for Site #1 and a 69.5% loss for Site #2. In monetary terms, these recreation benefits losses amount to \$22,331,198 for Site #1 and \$34,688,087 for Site #2 between 2000 and 2015.

Lakeside recreation sites located upstream of the dam and alongside New River and Bluestone River are largely managed by WVDNR through a long term lease arrangement. Provisions in that lease document allow the Corps to operate the project for flood control as needed and thereby inundate any and all recreation sites when required to store flood water. For this reason, there is no need to compensate the lessee (WVDNR) or mitigate for losses to recreation in that project area. In contrast to downstream recreation losses, upstream recreation losses aren’t permanent during construction, but are intermittent and more moderate in impact. Operation of the dam using only 8 of 16 available sluice gates (at any one time 8 sluice gates will be inoperable during construction in the stilling basin) results in

more frequent pool filling and both higher and longer duration pools above summer and winter pool elevations.

There are 10 specifically named recreation sites upstream of the dam on Federal property. Based upon analyses described above, it is estimated that 292,682 recreation visitor days will be lost over a ten year construction period. The value of those visitor days lost is estimated to be \$2.8 million. In an effort to reduce impacts on project visitors, a project media outreach program could be established to notify potential visitors in a multi-state region when higher pools at Bluestone Lake are anticipated as a result of basin rainfall and reduced gate operations. Potential visitors would be informed through this program of alternative recreation sites in the region where they may find optional camping and water access sites.

Coordination of these potential impacts with WVDNR resulted in a letter response dated October 20, 2016 from the Chief, WV Division of Natural Resources outlining several concerns associated with increased inundation (frequency and duration) of several recreation sites still being operated by that agency. Increases in cost for post-inundation repairs and cleanup as well as losses of visitor fees were concerns included in the letter. Additional concerns were expressed for continued operation of the "Pit" launching area, the East shoreline boat-in camping areas, the Meador campground in Bluestone State Park and marina. The time periods and anticipated site down times expressed in the letter are in line with anticipated closures and impacts outlined in this document.

Summers County, West Virginia has assumed operation and maintenance responsibility for several upstream recreation sites including Bull Falls, Bertha, Mouth of Indian Creek, Cedar Branch and Shanklins Ferry after WV DNR was compelled to end their operation and maintenance of those sites due to a significant drop in state agency funding to support those sites. Potential impacts to upstream recreation areas (site down times and costs) now being operated and maintained by Summers County have not been expressed by Summers County as of this writing.

**H. Potential Recreation Resources Losses:** In addition to periodic recreation use interruptions during construction-related pool rises that would occur over ten years, there is an additional potential impact from increased pool rises that would likely accumulate over the course of ten years. This impact concerns recurring damages wrought upon natural resources that support unique recreation experiences at the project. The Bluestone Lake project derives a substantial portion of its visitor attraction from its dramatic visual quality due to elevation changes and both diversity and maturity of vegetation, a diverse landscape that creates seasonal interest (fall coloring) and stunning visual quality that enhances each recreation experience. A similar quality of natural resources beauty is seen downstream through the New River Gorge National Park area and that resource's dramatic landscape generates high visitation there as well.

Given that Bluestone Lake has been operating for flood control purposes since the 1940's, repeated inundation of recreation areas has likely taken a toll on some pre-project vegetation types that weren't suited for prolonged inundation when New River was free-flowing. Those pre-existing vegetation types have been naturally replaced over time by species and varieties more attuned to seasonal rises in the conservation and winter pools being operated for flood control purposes. Since Bluestone Dam has been historically operated using all 16 sluice gates, periodic inundation due to high inflows has been relatively infrequent and inundations of recreation sites are short in duration. Recorded data indicate that the lake



only experiences an average of 18 days annually when the pool elevation is above elevation 1410 (conservation or summer pool) thereby affecting lakeside and riverside recreation sites. A visual inspection of the lake shoreline and recreation sites indicates that current vegetation and associated natural resources that support the recreation experience are being sustained through normal dam operations and site maintenance efforts. Other than occasional influxes of woody debris associated with higher, storm-related inflows recreation sites and shoreline/riverbanks appear to be in good condition.

The projected increase in frequency and duration of inundation due to reduced sluice gates operation could endanger mature vegetation located around and within recreation areas. The elevation exceedance tables shown above indicate a trend of higher and more frequent pool elevations during spring leaf-out and flowering season (March through May). Being inundated for any appreciable amount of time during bud-development, flowering and leaf-out period would be injurious to many plant species (trees, shrubs, vines, perennials) in the inundation zone. More frequent and longer duration inundation during spring months, when repeated over a ten year period, could reduce health and diversity of vegetation resources upstream of the dam leading to a landscape composed of vegetation in varying stages of demise or deterioration at recreation areas. Owing to the visual importance of vegetation to the recreation experience at Bluestone Lake, this future condition may result in reduced visitation until these resources can regenerate.

Other threats that could affect natural resources that support recreation include introduction of invasive species (vegetation and/or wildlife/insect pests) that native species could not compete with or withstand in a weakened condition (repeated inundation), changes in rainfall and temperature patterns due to regional climate changes, forest fires and/or introduced plant diseases. Given the southerly extent of the watershed (water transport of invasive species and pests) and influx of visitors from diverse exotic plant/insect/disease regions, introduction of these threats is highly likely in the future. Other components of recreation experiences at Bluestone Lake could likewise suffer losses to visual quality (lake shoreline vegetation and shoreline banks) resulting in losses to recreation visitor days as project lands recover from these inundation episodes. A period of resources recovery following a ten year hiatus that relies on natural processes alone could last several (10-20) years. Any efforts to eradicate invasive species that have emerged/arrived during the intervening ten years and to initiate restorative plantings would be a significant cost for the project (Corps) and lessee.

**I. Recreation Visitor Days Lost and Potential Effects on the Local Economy:** Sections above explain the loss of recreation visitor days in both the downstream and upstream areas of the project. Downstream recreation visitor losses could amount to over 2.7 million visitor days and upstream visitor day losses (due to more frequent inundation of recreation areas) could reach 292,682 visitor days over the 10-year period of construction. Both of these losses are substantial, but given the presence of other recreation resources in the region and the fact that mitigation actions are being put into place both below the dam and within the lake area, some losses will be reduced to more acceptable levels. Unfortunately, local business losses associated with this reduction in visitor days may not be so easily remedied.

Section 4.17 of the SEIS identifies local communities and components of the local economy surrounding Bluestone Lake and interactions between project visitors and local businesses. This section addresses preliminary impacts of proposed Phase 5 construction on these local economies. For the purposes of this analysis the primary areas of local economic impact are considered to be Summers County, Mercer

County and Monroe County in WV and Giles County in VA. Local communities that could experience the effects of reduced visitation at Bluestone Lake include Hinton, Athens, Princeton, Shady Spring, and Sandstone in West Virginia and Glen Lyn in Virginia. Visitation at Bluestone Lake does support local businesses through sales of sports-related equipment and camping-related commodities and merchandize, food purchased at grocery stores or at local restaurants, ammo and weapons for hunting, state licenses and bait/tackle for fishing, fuel purchases for vehicles and watercraft, overnight accommodations, camping fees, marina rentals and other necessities supporting an extended stay at the project. Individually, these seasonal purchases do not significantly impact the community, but cumulative effects of hundreds of thousands of people visiting the local area who are purchasing goods and services has a significant effect on the local economy in terms of business revenues, employment in retail and service-related sectors and municipal/county taxes.

For example, during 32 years of recorded visitation, over 55.6 million people have visited Bluestone Lake. If each family (assuming 60% family use and 2.5 persons/family) spent \$10.00 for fuel at a local service station while visiting, those cumulative expenditures amount to over \$133.4 million dollars invested in the local economy (just service stations) during those 32 years. Recent surveys conducted by the Institute for Service Research (December 2015) addressing the economic significance of West Virginia State Parks indicates that day-users at those types of facilities (i.e. Bluestone State Park and Pipestem State Park) may spend \$10.99/day in food, fuel, transportation, sporting goods and souvenirs. That study also indicated that overnight users who are camping in and around State Parks may spend upwards of \$54.80/day for similar items including camping fees. Additional studies conducted on expenditures by fishermen, hunters and wildlife watchers indicates that these visitors may spend \$72, \$22, and \$28 per day respectively (2011 National Survey of Fishing, Hunting, and Wildlife Associated Recreation for West Virginia).

Using these modest rates of expenditure, Table 10 indicates that annual expenditures in the local economy driven by visitation at Bluestone Lake could be as much as \$37.7 million. A percentage of Bluestone Lake project visitors are local residents of Hinton/Bellepoint/Glen Lyn whose weekly purchasing habits regularly support the local economy, but a portion of that visitation (estimated by PDT members to be approximately 40%) originates outside of the local area and their purchases (or lack thereof) could have a direct economic effect. Loss of recreation access to downstream fishing areas and intermittent closures of lakeside recreation areas due to inundation and post-inundation clean up over a sustained period of time (construction period) would likely have direct economic effects. Mitigation actions will compensate for some losses in visitor days, but of great concern would be losses to fishing visitation due to more frequent inundation of several boat launching ramps and the marina. Fishermen as a visitor group reportedly spend more during a visit (\$72/day) than the other visitor categories and these revenue losses would be difficult to mitigate near the project site.

**Table 10 - Estimated Total Annual Expenditures in the Bluestone Lake Local Economy<sup>9</sup>**

Recreation Sites	Camping Visitors (\$55/day)	Fishing and Hunting Visitors (\$72/\$22/day)	Wildlife Watchers (\$28/day)	Other day use activities (\$11/day)	Totals
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<sup>9</sup> Based upon mean annual usage value of all years in period of record (32 years) and the expenditure rates described in the Institute for Service Research (December 2015) study and the 2011 National Survey of Fishing, Hunting, and Wildlife Associated Recreation for West Virginia.

Pit launching Site	\$548,048	\$2,391,480	\$93,002	\$219,219	\$3,251,749.
Marina	\$365,365	\$1,674,036	\$93,002	\$365,365	\$2,497,768.
Bluestone State Park	\$5,115,110	\$1,319,177	\$204,604	\$82,134	\$6,721,025.
Bluestone Conference Center	\$1,485,598	\$583,435	\$151,261	\$148,560	\$2,368,854.
Bull Falls	\$1,203,348	\$625,733	\$61,261	\$84,234	\$1,974,576.
Bertha	\$2,023,090	\$956,374	\$93,631	\$91,959	\$3,165,054.
Mouth of Indian Creek	\$4,365,840	\$1,424,960	\$185,217	\$175,798	\$6,151,815.
Cedar Branch	\$1,452,161	\$554,467	\$67,207	\$66,007	\$2,139,842.
Shankin's Ferry	\$2,121,402	\$674,992	\$98,181	\$131,758	\$3,026,333.
Glen Lyn Park	\$2,297,052	\$2,373,644	\$584,704	\$1,186,657	\$6,442,057.
Totals	\$20,977,014.	\$12,578,298.	\$1,632,070.	\$2,551,691.	\$37,739,073.

Some portion of this potential loss may be offset by alternative recreation opportunities in Bluestone Lake's immediate area such as Pipestem State Park and other adjacent recreation sites. If these alternative sites are not at full capacity when Bluestone Lake pools are higher, then visitors (especially campers) can still enjoy the visual quality and outdoor pursuits of the local area and would likely patronize local businesses reducing economic impacts of pool rises and lost visitors days. Fortunately, the season when Bluestone Lake recreation sites are most likely to be inundated (February through May) and out of service doesn't coincide with the heaviest recreation use period at most alternative sites (June through September). Capacity rates for alternative sites have been estimated through research of the WV state park database and phone surveys of local recreation sites surrounding Bluestone Lake.

Of those camping facilities closest to the construction site at Bluestone Dam, Bluestone State Park and Bluestone Wildlife Management Area exhibit low campground occupancy rates, with Bluestone State Park having an annual rate of 24.5% (FY2014-2015) and Bluestone WMA having an annual rate of only 4.6%. The peak month for campground occupancy at Bluestone State Park is July, with an occupancy rate of 39.4% (FY2014-2015 data). The peak month at Bluestone Wildlife Management Area is also July, but with an occupancy rate of 10.97% (FY2013-2014 data). On the whole, information from the West Virginia State Parks database indicate an aggregate occupancy rate of 30.56% (FY2015-2016) for all state parks offering camping. Trends by month show July as the month with the highest occupancy with an aggregate rate of 46.59%, while December shows the lowest occupancy rate at 4.07%<sup>10</sup>. State Parks nearest to Bluestone Dam had the following occupancy rates (FY2015-2016): Bluestone State Park – 22.52%; Pipestem – 24.28%; Little Beaver – 27.24%; Camp Creek – 36.57%; Stonewall – 63.59%; Babcock – 28.27%; Moncove Lake – 22.48%; and Twin Falls – 11.44%.

Table 11 shows the camping facilities capacities and occupancy rates for facilities in the region (50 miles travel distance) surrounding the project area during the period FY2014-2015.

<sup>10</sup> FY2015-2016 occupancy data, WV State Parks

**Table 11 - Estimates of Alternative Recreation Site Capacity and Occupancy Rates (FY2014-2015) <sup>11</sup>**

Recreation Site	Driving distance from Bluestone Dam	Camping capacity number of sites	Occupancy rate	Potential camping sites available
Bluestone State Park <sup>12</sup>	7	26	24.53%	20
Bluestone WMA <sup>13</sup>	10	330	4.57%	315
Pipestem State Park	13	82	23.39%	63
Little Beaver State Park	20	46	25.74%	34
Camp Creek State Park	27	38	34.42%	25
Stonewall State Park	30	46	70.71%	13
Babcock State Park	36	26	27.04%	19
New River Gorge National Scenic River	36	79	20.50%	63
Moncove Lake State Park	43	48	24.62%	36
Twin Falls State Park	46	50	9.51%	45
Plum Orchard Lake WMA	48	42	8.61%	38
Greenbrier State Forest	50	16	37.06%	10
Total number of regional camping sites that may be unoccupied at any time				681
Total number of camping sites that may be available other than BLN recreation sites				346

State Forests having camping facilities reported similar occupancy rates in FY2015-2016. The State Forest nearest to Bluestone Dam, Greenbrier State Forest, had a campground occupancy rate of 26.11% that year. Other State Forests in West Virginia report similar campground occupancies, with exceptions being Coopers Rock SF (62.94%), and Cabwaylingo, Kanawha, and Kumbrabow, which all had occupancies below 16%. Wildlife Management Areas administered by West Virginia State Parks (Berwind, Bluestone, Laurel Lake, Panther, and Plum Orchard) experienced very low camping occupancy rates in FY2014-2015, with all five having occupancies of below 10%. Panther State Forest recorded an occupancy rate of only 6% in FY2015-2016, which was actually its highest rate since FY1999-2000.

The nearest National Forest campgrounds to the dam are White Rocks Campground (35 sites) and Walnut Flats Campground (8 sites) in Jefferson National Forest, both of which are a 60-mile driving distance from Bluestone Dam. The Appalachian Trail (AT), which runs through Jefferson National Forest near these campgrounds, offers camping; however, camping on the AT is geared towards hikers and may be difficult to access for other modes of camping. Visitor use statistics for National Forests have not been received as of December 2016. National Park Service visitor use statistics<sup>14</sup> for New River Gorge National Scenic River and Gauley River National Recreation Area show that overnight stays in NPS

<sup>11</sup> A state database search and phone surveys to determine seasonal occupancy rates at local recreation areas featuring day-use and overnight camping facilities were undertaken by an AE Consultant under contract with the Huntington District.

<sup>12</sup> Portions or all of the Bluestone State Park campground could be inundated due to Bluestone Dam construction

<sup>13</sup> Portions or all of the WVDNR managed campgrounds could be inundated due to Bluestone Dam construction

<sup>14</sup> Statistics found at this URL address: (<https://irma.nps.gov/Stats/Reports/Park/NERI>)

campgrounds do not approach capacity. Occupancy rates appear to peak in June (57%<sup>15</sup> in June 2016 and 49% in June 2015), but are significantly lower in other months of the year.

As the narrative of site capacities and occupancy rates above and figures in Table 8 show, there appears to be a number of unoccupied camping sites available in the region (within 50 driving miles of the project area) throughout the year with July being the month of highest occupancy for most of the nearby sites. In fact, the number of unoccupied camping sites that may be available during any time of the year (346 – total from Table 8) other than July actually exceeds the total number of camping sites available at the Bluestone Lake project upstream of the dam (335 – total of 315+20 from Table 8). Since significant inundation impacts to recreation sites above Bluestone Dam are forecasted to take place between February and May, a span of months when alternative site occupancy rates may be lower, the impacts to the local economy could be minimized by reliance on other nearby recreation options and their promotion during this period.

A sustained media-based outreach program supported by the District, the Bluestone Lake project staff and the Public Affairs Office could be established to inform visitors of potential high pools at Bluestone Lake and that alternative camping sites (as displayed in Table 8 ) may be available. Providing contact information for each of the alternative sites would give potential visitors sufficient information to make informed vacation choices and maintain the mutually beneficial relationship between the public and the Bluestone Lake project that has supported 32 years of sustained visitation. Hopefully such outreach efforts would maintain a relationship between visitors and the project such that visitation levels at the project would return to pre-construction levels shortly after completion of Phase 5.

Downstream of the Dam: Analysis of downstream fishing losses at Downstream #1 and #2 sites revealed that as many as 2.7 million total visitor days (270,000+ annually) could be lost due to closure of Downstream #2 site and limited use of Downstream #1 site (given cessation of use at the “beach” and “catwalk” during the ten year construction period). Since a substantial portion of these fishermen are likely of local origin, this visitation loss may not impact the local economy as significantly as visitors to the project whose origin is outside of the region (estimated to be about 15%) and who are staying for multiple days and purchasing food, fuel and lodging. Some fishing can still take place below dam (beyond a 300 foot construction work limit) and in other river locations along Greenbrier and New rivers thus reducing the impact of these losses. The proposed fishing access site planned below the dam adjacent to the Hinton City Park will provide an alternative, safe access for wading fishermen and bank fishermen. This proposed access site takes advantage of existing parking opportunities that serve other Downstream Site #1 recreation opportunities. An additional ADA-compliant mitigation access site will be constructed at the Bluestone State park boat launching ramp that will feature multiple-level decks in the lake for disabled and/or elderly fishermen and youth to access productive waters. It is anticipated that an ADA-compliant fishing platform will be re-established at the Site #2 location at the completion of construction.

Upstream of the Dam: Current estimates are that approximately 292,682 visitor days would be lost at lakeside and riverbank sites upstream of the dam due to more frequent inundation of those sites.

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<sup>15</sup> Figures calculated by dividing the number of “Overnight Stays” by the number of campsites in the park(s) for each month of FY 2015-2016.

These losses would consist of both day-use (boating, fishing, picnicking, sightseeing, and hiking) and overnight use (camping) visitors. Given that the most significant recreation impacts are expected to occur between February and May (prime fishing months) and that several of the more popular boat launching ramps would be inundated on a frequent basis, it is safe to assume that some portion of the expenditures by visitors to the Bluestone Lake project who are fishermen shown in Table 9 will likely be lost during the construction period. Visitors who favor camping may find alternative recreation opportunities in the local area (i.e. Pipestem State Park) that are not at 100% of capacity (see Table 8) during that early spring season allowing visitors to remain in the local area and perhaps make purchases (fuel, food, equipment, bait, licenses, overnight accommodations) at local businesses. Nevertheless, there will be impacts to the local retail and service businesses due to the prolonged period of construction at the dam.

**J. Economic Loss Offsets:** Some impacts (lost tax revenues from local businesses to municipal governments) would be offset by business taxes paid by contractors working on the project and purchases by workers (fuel, food, clothing, hotels, and rentals) at local businesses. Sections below attempt to define what losses to a local economy might occur as a result of site closures and what mitigation features might be instituted to offset those losses.

Loss of access to the “beach” and submerged “catwalk” and elimination of the cantilevered platform would result in significant losses of visitation associated with downstream fishing use during the construction period. To some extent these losses can be offset by mitigation actions to provide access to the river via a fisherman access site on the right descending bank located near existing parking and restroom facilities. This site could feature safe river access for wading fishermen who can continue fishing in the river below the construction work limits. With substantial parking capacity and restroom facilities (neither of which are available at the cantilevered platform site) this site could accommodate a significant portion of lost fishing usage. An additional ADA-compliant access site located within Bluestone Lake at the Bluestone Lake State Park boat launching site would also offset some of this lost fishing access. This facility with parking and an adjacent boat launching site would be designed with multiple-level decks to allow access at differing pool heights.

Recurring inundation of the Pit launching area, the Marina, and both the Bertha and Bluestone State Park boat launching sites will significantly curtail fishing at the lake during the spring season. Loss of access to lakeside recreation sites including loss of ability to launch boats for fishing, boating, water skiing and other water-sports in a high quality resource is an impact for which there are no feasible mitigation opportunities. There are alternative lake fishing opportunities in the region at Corps of Engineer and WV Department of Natural Resources lakes which could accommodate these fishermen, but losses to local businesses would not be recoverable. There are alternative camping opportunities in the local area (i.e. Pipestem State Park), and those alternative sites may not be at 100% capacity (see Table 8) during periods of site closures at Bluestone, but that availability doesn’t assure that visitors will still come to the local area and support the local economy.

Loss of business revenues historically provided by visitors to Bluestone Lake is generally not within the legal purview of the Corps to compensate, but local business leaders may consider negotiating with local governments (i.e. City of Hinton) for a reduction in business tax rates during this period. Increased promotion through Chambers of Commerce and Visitors Bureaus may be able to maintain or increase visitation to nearby recreation areas that would offset some business losses. Overall, increased public

awareness of the intermittent closures of recreation areas at Bluestone Lake through a sustained program of Corps-generated press releases and information to regional media outlets may reduce conflicts with the recreating public and help to re-establish the Bluestone Lake visitor base when the construction period is ended.

