Idaho 2024 Interagency Forest Practices Water Quality Audit

State of Idaho

Department of Environmental Quality

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Acknowledgments

The 2024 audit team thanks the staff members of the Idaho Department of Lands, Idaho Department of Environmental Quality, United States Forest Service, and Bureau of Land Management that assembled the information used in selecting and locating timber sales.

We thank the foresters, supervisors, and 119 members of the public that attended and assisted with this audit. Their dedication to sustainable forestry in Idaho was plain to see.

We thank our families for tolerating our long absences during an extended field season that involved ten weeks and over 20,000 miles of travel.

Planning advice for the 2024 audit was provided by the Idaho Department of Lands and several members of the Idaho Forest Practices Act Committee. The cover photograph was taken by Hawk Stone from the 'Happy Trails' timber sale near New Meadows.

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Abbreviations, Acronyms, and Symbols

DEQ	Idaho Department of Environmental Quality
EPA	US Environmental Protection Agency
FPA	Forest Practices Act
FPAC	Forest Practices Advisory Committee
GIS	geographic information system
IDL	Idaho Department of Lands
LOD	large organic debris
OHWM	ordinary high-water mark
SPZ	stream protection zone
TMDL	total maximum daily load

Executive Summary

Forestry operations in Idaho are regulated by the "Rules Pertaining to the Idaho Forest Practices Act" (IDAPA 20.02.01) under Idaho Code § 38-13. From May to October 2024, the Idaho Department of Environmental Quality (DEQ) and Idaho Department of Lands (IDL) conducted their eleventh statewide audit of these rules. The audit had two purposes: compliance (i.e., were the rules being implemented?) and performance (i.e., when implemented, were the rules effective at protecting water quality?). The audit has been conducted every four years since 1984.

The audit team visited 58 timber sales, spread evenly across four ownership categories: federal, private industrial, private non-industrial, and state. Sales from every geographic area and administrative authority in Idaho were included. All the sales observed included at least one fish-bearing stream.

At each sale, the audit team aimed to assess every applicable rule and to inspect every road, stream crossing, and drainage pipe. 43 sales were visited for the first time, and 15 were re-visited, having been audited in a previous cycle. The re-visits allowed the team to assess compliance with replanting and road maintenance rules.

Out of 2,250 total observations, the team observed 2,133 instances of compliance with the rules. This represents an overall compliance rate of 94.8%, indicating that timber harvest in Idaho generally follows the rules and does not pose a threat to water quality.

Albeit still high and only slightly lower than the 96% compliance found in the previous audit, a 94.8% represents the lowest compliance rate since 1992. Compliance was the highest on federal (97%) and industrial land (96%) and lowest on private non-industrial (93%) and state-owned land (92%). Compared with the previous audit, all landownerships except federal decreased in compliance rate. The most notable decline was on state-owned land, which decreased from 95% compliance to 92%.

The audit team applied the rules stringently and did not allow any leeway or discretion. More than half of the sales failed at least one rule, with an average of 2.02 violations per site (compared to 1.55 violations per site in 2020). 25 sales (43%) were in perfect compliance. 41 sales (71%) violated two or fewer rules. 3 sales (5%, the 'bad apples') were responsible for one third of the violations. Those same three sales were also the only ones with a high likelihood of delivering significant sediment to streams.

The most common problem, accounting for 20% of the violations, was bare dirt from the construction and maintenance of roads and skid trails being left in the stream protection zone (SPZ). The second most common problem was the use of ground equipment in the SPZ.

Several problems were related to variances. Varying from a rule is allowed, provided that it is coordinated with IDL in advance and results in equal or better environmental results over the long term. One variance was improperly granted — it did not provide equal protection. On two other occasions, the extra practices required by the variance were not followed. On several

other occasions, the variance was not written broadly enough to cover all the deviated rules. IDL forest practices advisors should always oversee variances, which was not always the case.

All new Class I culverts met the requirements for fish passage, a significant improvement from 2020. However, three sales featured new culvert pipes that were too short. The shorter pipes created steep headwalls, which then eroded into the creek. Longer pipes are less subject to fill erosion.

The audit team revisited 15 sites from previous audit cycles. Replanting had always occurred, and road maintenance was usually good.

Since the previous audit, some new road protections and a revised shade rule have been added. These rules offered noticeably better resource protection, and were followed on all but one occasion.

Finally, the audit team visited three "Good Neighbor Authority" sales, which are on federal land but administered by the state of Idaho. The auditors found no difference in compliance between these and regular federal timber sales.

Policy Recommendations

The audit team found that the rules are generally effective when fully enforced. DEQ makes the following suggestions to improve enforcement:

OPERATIONAL SUGGESTIONS:

1. IDL's forest practices advisors should pay particular attention to the disposal of sediment from maintenance and construction activities. There should be no unstable bare earth left in the SPZ. (This is the same recommendation made in 2020).
2. IDL should continue to educate private non-industrial landowners about the importance of keeping equipment out of the SPZ.
3. State timber sales should be overseen in the same manner as private industrial sales, in line with existing policy. IDL's forest practices advisors should be involved in oversight and inspection, especially when variances are involved.
4. Rule variances should describe in detail why the rule cannot be followed as written. They should also spell out precisely how additional risk or damage will be avoided or mitigated. These conditions should not be of a general form and should instead explain how the rule being varied will be bolstered to ensure equal or better long-term protection.
5. When a road is built or reconstructed in an SPZ, the additional practices required by the variance should mitigate both the sediment *and* temperature impacts of removing trees.
6. Water truck operators should be reminded to properly screen their diversions.
7. IDL's forest practices advisors should examine culvert fills to ensure they are not overly steep and in danger of eroding directly into the stream. This is particularly a

problem if the culvert pipe is too short or on very steep ground. Supplemental stabilization measures (such as seed, mulch, slash, or rock) may be needed.

In a few situations, the audit team found the rules inadequate or ambiguous. The auditors recommend changing the rules to provide more protection and clarity. In the interim, DEQ suggests including these ideas in the guidance document used by forest practices advisors:

RULE SUGGESTIONS

1. Require erodible fills in SPZs to be stabilized as soon as practical, instead of before seasonal runoff. (040.03c)
2. Require stream crossing culvert pipes to be long enough to avoid excessively steep fills. (040.02e and/or 040.02d)
3. Ensure mitigation practices required by a variance are enforceable. (020.01)
4. Clarify that large slash piles are not permitted within an SPZ. (030.07fii)
5. Consider modifying the definition of 'Acceptable Tree Species' to include mature hardwoods. (010.02)

In addition, IDL (through its Forest Practices Advisory Committee) should continue to work on establishing a minimum tree retention requirement for Class II streams contributing elevated temperatures to downstream waters. Since the previous audit report, significant work has been published on this issue and points a possible way forward that involves shading the lower reaches of Class II streams.

DEQ-written temperature management plans, known as total maximum daily loads (TMDLs), govern a small subset of Class II streams. To encourage voluntary participation with shade targets, IDL should consider notifying landowners when their proposed harvest area overlaps a TMDL stream. This could be incorporated into the GIS-based notification system.

1 2024 Idaho Forest Practices Water Quality Audit

The 2024 audit was conducted between May 28 and October 4, 2024. Staff from the Idaho Department of Environmental Quality (DEQ) and Idaho Department of Lands (IDL) visited 58 forestry operations to assess compliance with the "Rules Pertaining to the Idaho Forest Practices Act" (IDAPA 20.02.01) under Idaho Code § 38-13 (Forest Practices Act [FPA]). This report contains the audit team's findings and recommendations.

1.1 Background

The administrative basis for the 2024 audit includes the federal Clean Water Act, *Forest Practices Water Quality Management Plan for the State of Idaho* (Bauer et al. 1988), *Idaho Nonpoint Source Management Plan* (DEQ 2015), and "Memorandum of Understanding Implementing the Nonpoint Source Water Quality Program in the State of Idaho" (DEQ 2020). Forest audits have occurred every four years since 1984, most recently in 2020 (Stone 2020).

1.2 Purpose and Objectives

The 2024 audit assessed timber sale compliance with the "Rules Pertaining to the Idaho Forest Practices Act" (IDAPA 20.02.01), under Idaho Code §38-13, and ensured these rules protect water quality.

DEQ identified each FPA rule with a bearing on water quality (Appendix A). DEQ then reworded the rules into yes/no questions and built them into an electronic form (Appendix B). Sometimes a complex rule yielded multiple questions. At every site, the audit team answered each applicable question. Often, rules were found to be not applicable. For example, the question "Are quarries properly drained? (040.03f)" could only be answered if the sale used an on-site rock quarry — an unusual occurrence.

DEQ calculated the compliance rate by dividing the number of affirmative answers by the total number of applicable questions.

To goal of ensuring that the rules are sufficient when followed was more qualitative. All the auditors have substantial experience in timber harvest and water quality and used their professional judgement to critique the effectiveness of the rules. The auditors inspected streambeds to determine whether sediment had entered the channel and noted detrimental conditions to water quality on the field forms. Rigorous hypothetical questioning accompanied most audits.

2 Study Design

2.1 Assessment Scope

The audit assessed whether the FPA rules (IDAPA 20.02.01) are being implemented statewide. Therefore, the recommendations are statewide in scope. No recommendations are made concerning individual timber sales, and individual findings will not be presented.

2.2 Assessment Methods

2.2.1 Audit Team

The audit team included representatives from IDL and DEQ. Hawk Stone, the DEQ auditor, was present at every sale. Gary Hess was the primary IDL auditor. Jeanne Bradley and Ara Andrea of IDL also attended many audit sites. At least one of the three IDL auditors was present at every sale. For most site visits, the private, state, or federal forester or forestry specialist was present to provide background information but was not involved in rating the operation. Landowners, operators, and interested parties were invited to attend. A total of 119 visitors accompanied the audit team during the summer. A website, hosted by DEQ, announced audit locations and meeting places.

2.2.2 Timber Sale Selection

Candidate timber sales were selected by DEQ using the following criteria:

- Sale operations began between January 2022 and September 2024, or the site was visited during a previous audit cycle.
- Cutting units bordered or contained at least 500 feet of a Class I (fish-bearing) stream.
- Cutting units included at least 5 cumulative acres of harvested area.

When a state or private timber sale is planned, the operator files a notification form with IDL. These forms have check boxes indicating the activities to be performed, the chosen method of slash disposal, and environmental risk factors present such as steep slopes or streams.

One of the check boxes indicates the presence of a Class I stream, which formed the initial panel of audit sites. The Class I determination is geographic information system (GIS)-based and is made by the landowner and IDL administrative staff upon submission of the notification form. To ensure the audit focused on timber harvesting activities, DEQ only considered forms that indicated “harvesting of forest tree species” (other possible notification activities included “use of chemicals” or “conversion in use”).

The size of the cutting units is not recorded on the notification form. However, one of the slash management options is “The contractor attests that he will not cut an amount of timber sufficient to cause a fire risk.” According to the IDL fire staff, this choice loosely correlates to 5–

10 acres of cutting area. Therefore, DEQ discarded all forms with this slash management option, leaving only the larger sales.

The audit team was left with 411 eligible state and private sales that met the above criteria.

For federal sales, DEQ contacted the regional foresters for the United States Forest Service Intermountain and Northern regions and the Bureau of Land Management's state director. In collaboration with the individual forests and districts, they provided a list of 47 sales that met the above criteria.

From these 458 candidates, 43 individual sales were randomly selected for auditing using the following stratifiers:

- At least 10 sites from each of the four ownership categories: federal, private industrial, private nonindustrial, and state.
- At least two private or state operations in each of the ten IDL supervisory areas, if available.
- At least one federal sale in each national forest and BLM district.
- At least one federal sale that was part of the 'Good Neighbor Authority' program, where the state of Idaho administers the harvest on federal land.

Random selection was accomplished by assigning each sale a random number from a Python-generated script and picking qualifying sites in numerical order.

For each site, DEQ and IDL confirmed that timber harvest had occurred (or would occur before September 2024) and the other information on the notification form was correct. The audit team contacted landowners 2–3 months in advance to arrange a visit date.

In addition, twelve sites from the 2020 audit, two sites from the 2016 audit, and one site from the 2012 audit were revisited to assess compliance with replanting and maintenance rules not applicable in recent sales. In a few cases, these sites had not been fully harvested during the previous audit. For these cases, auditors assessed all newly applicable rules. These sites were selected based on proximity to primary audit sites. All sites are displayed in Figure 1.

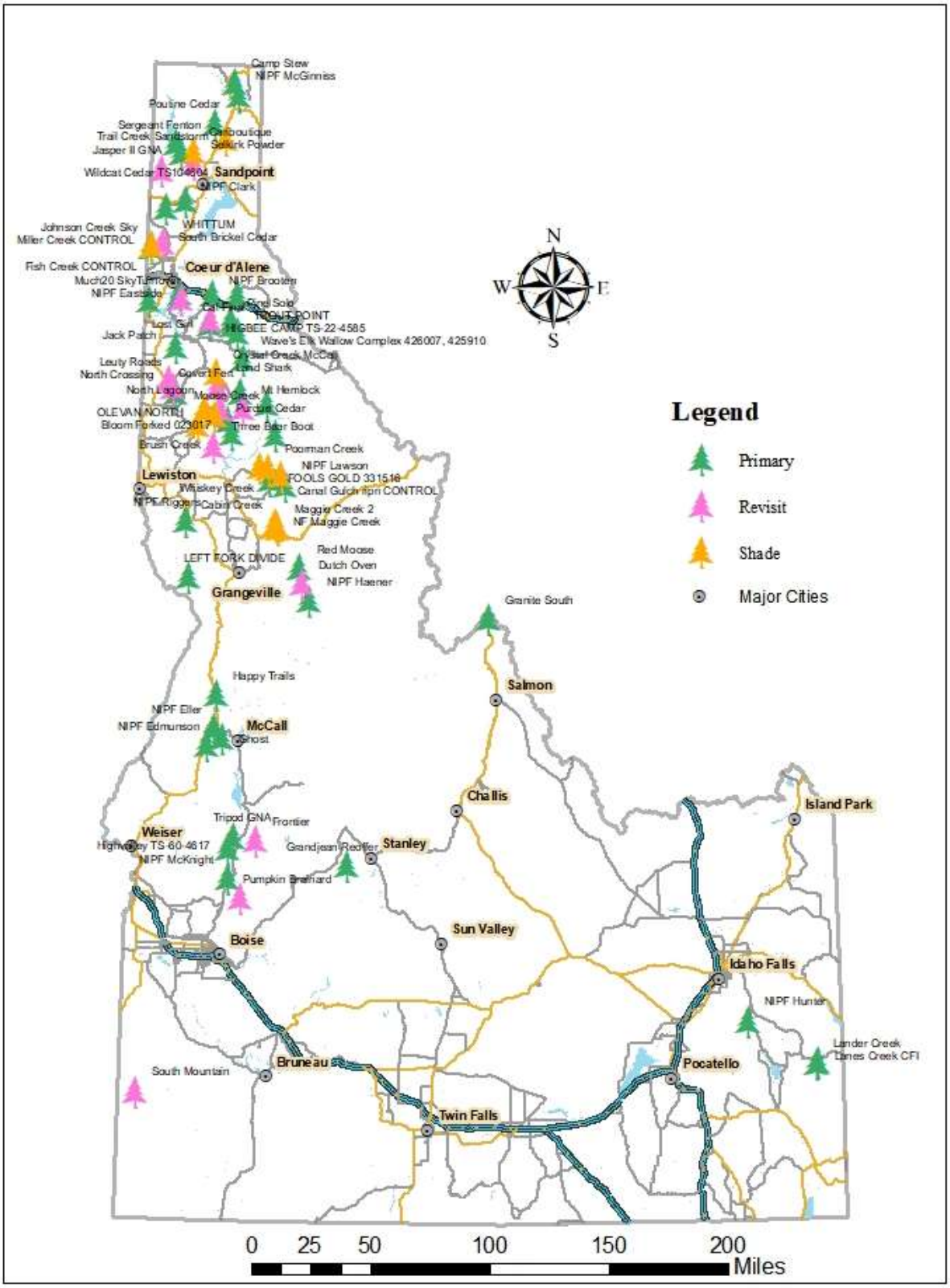

Figure 1. Locations of audited timber sales (see section 6 for an explanation of the 'Shade' sites)

2.2.3 Audit Process

The audit team, along with any observers (foresters, sale administrators, landowners, members of the public, and other interested parties), toured most of the disturbed areas within each timber sale to inspect skid trails, roads, culverts, stream crossings, slash distribution, and any erosion-control practices present. Following the inspection, the audit team convened and evaluated the sale in terms of compliance with applicable forest practices rules. The auditors strived to be unanimous in their rating, although this sometimes required extensive debate. The audit team assessed the rules based on their plain text and did not allow any of the leeway or discretion that forest practices advisors may choose to extend. Where necessary, the Forest Practices Act Guidance document (IDL 2022) provided additional perspective.

The team would typically audit sites Monday through Friday, visiting one or two per day, following a prearranged fieldwork schedule. With one auditor based in Boise and the others in Coeur d'Alene, this required extensive travel – an excess of 20,000 miles flown and driven between May and October 2024.

2.2.4 Data Assessment

Once all the timber sale visits were completed, findings were compiled for each of the 139 individual rules audited (Appendix A). DEQ calculated compliance percentages for individual rules across all timber sales by dividing the number of times a rule was complied with by the total number of instances the rule was applicable. DEQ also assessed compliance rates across rule groups and landownership categories.

2.2.5 Quality Assurance

The audit, being a series of 'pass/fail' questions, combined with professional judgement, is not suitable for a traditional quality assurance plan. Carefully creating the audit forms minimized bias, ensuring they addressed and clearly stated every applicable FPA rule. Systematic use of these forms guaranteed that each site was fully and repeatably evaluated. Electronic field forms (Appendix B) eliminated data transcription errors. Variability was reduced by using seasoned staff; all of the auditors were familiar with the process, having participated in the same program four and eight years prior.

3 Assessment Results

This section presents the audit results. The overall compliance results are reported first and are then broken down by land ownership, rule group, and individually. An analysis of compliance distribution follows.

3.1.1 Overall Rule Compliance

The audit team observed 2,250 instances where the Idaho FPA rules were applicable within the 58 timber sales audited. Of these, 2,133 instances exhibited compliance, resulting in an overall

compliance rate of 94.8%. Although still high, and only slightly lower than the 96% compliance found in the previous audit (Stone 2020), the 94.8% compliance rate is the lowest since 1992 (Figure 2).

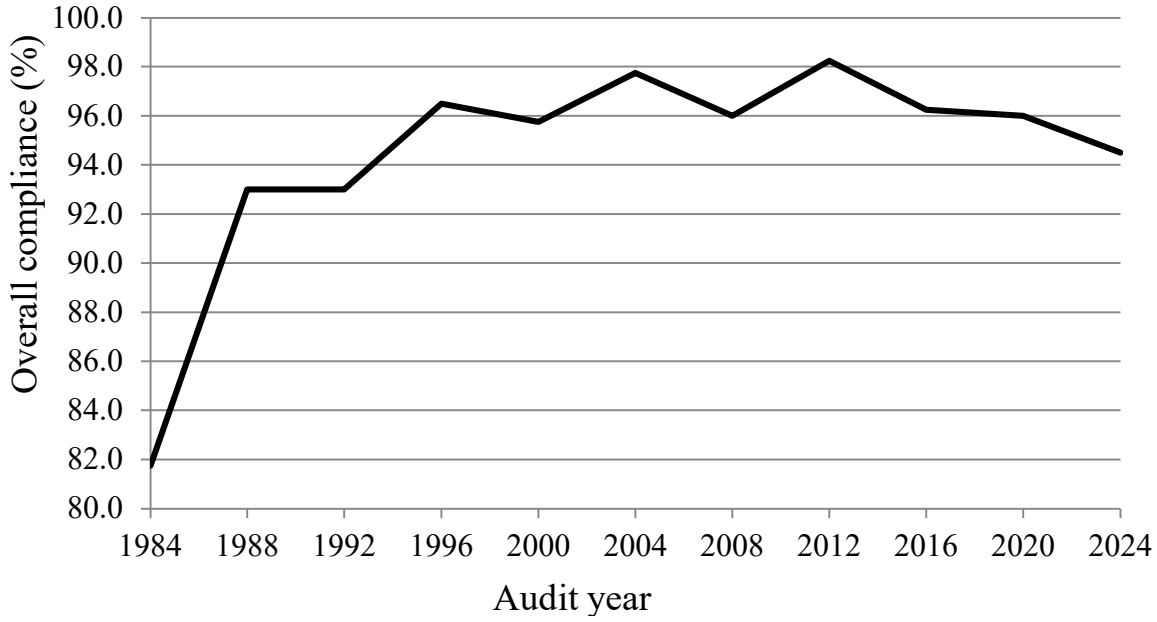

Figure 2. Average compliance rates since 1984 (Bauer et al. 1985; Harvey et al. 1989; Hoelscher et al. 1993, Zaroban et al. 1997; Hoelscher et al. 2001; McIntyre et al. 2007; Zaroban and Prisock 2009; Zaroban 2012; Stone 2016; Stone 2020).

The decline in compliance is likely meaningful because the rules, auditors, and auditing method were largely unchanged for the last three audits.

There were on average 2.02 violations per site, compared with 1.55 in 2020 — a 0.47 increase per site.

The reasons for the decrease in compliance are unknown, but anecdotal evidence collected during the audit can perhaps offer some clues:

- State and private industrial harvests have grown more intense over the past few years. Compared to 2016, it seems that foresters are attempting to get more wood from more difficult places. For example, where previously marginal timber along a Class II stream might have been left uncut, now it is often removed, and the additional trails built and SPZs entered increases the number of rules encountered. In conversation, industrial and state foresters reported corporate/agency directives to not leave trees unharvested, and clearcutting has increased in prevalence, especially on state land.
- Timber sales are getting bigger. A larger sale puts more acreage under the rules, increasing the chance of non-compliance. Our pass/fail assessment methodology does not easily represent multiple violations of a rule, so it is possible that the *rate* of

noncompliance (i.e., the number of violations per board foot of timber removed) has not changed. Audits did not track the size of the sales, so they are unable to speculate on this statistic.

- There has been a lot of staff turnover after the pandemic, particularly at the state. New inspectors, new foresters, and new supervisors are all learning their roles. They are perhaps more likely to make mistakes. Due to the new staff influx, coordination of long-timeline projects has been difficult, leading directly to several violations. For example, when the forester changed, a variance requirement to grass-seed an SPZ skid trail was overlooked.

3.1.2 Compliance by Ownership

The compliance rates within each of the four landownership categories were above 92% (Table 1; Figure 3). The highest compliance rates were in the federal and private industrial categories at 97% and 96% respectively. Private non-industrial landowners complied with 93% of the rules, and the state complied with 92% of the rules.

Table 1. Summary of 2024 overall rule compliance by landownership category.

Ownership	Applicable Instances	Complied	Compliance Rate
Federal	572	555	97%
Private industrial	672	648	96%
Private non-industrial	450	419	93%
State	556	511	92%
Overall	**2,250**	**2,133**	**95%**

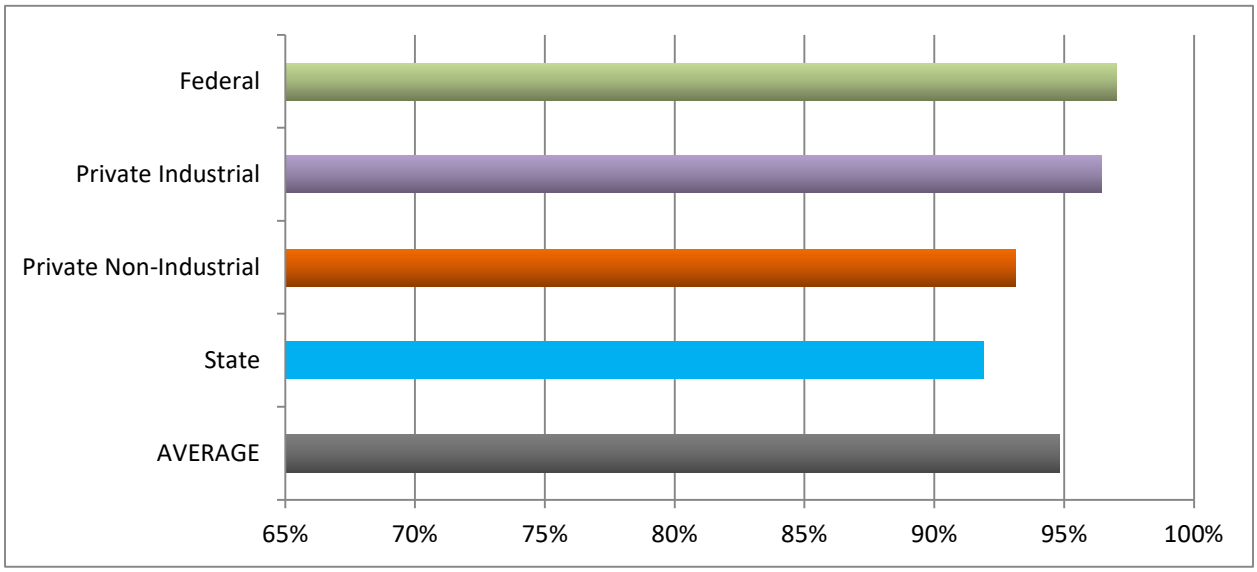

Figure 3. Compliance by ownership in 2024.

With the exception of federal lands, every category was lower than in the previous audit. The state land in particular has exhibited a notable decline since 2012 (Table 2; Figure 4). Three of

the federal sales were part of the 'Good Neighbor Authority' program, which means the state administered them on federal land. The auditors found no difference in compliance between these sales and regular federal sales; both were 97% compliant.

Table 2. Overall rule compliance rates by landownership category across audit years.

Year	Compliance Rate (%)				
	Federal	Private Industrial	Private Nonindustrial	State	Average
1984	96	82	82	67	**82**
1988	94	95	86	97	**93**
1992	93	96	94	89	**93**
1996	100	98	95	93	**97**
2000	98	94	95	96	**96**
2004	100	99	93	99	**98**
2008	98	96	91	99	**96**
2012	99	99	96	99	**98**
2016	96	97	94	96	**96**
2020	96	97	96	95	**96**
2024	97	96	93	92	**95**

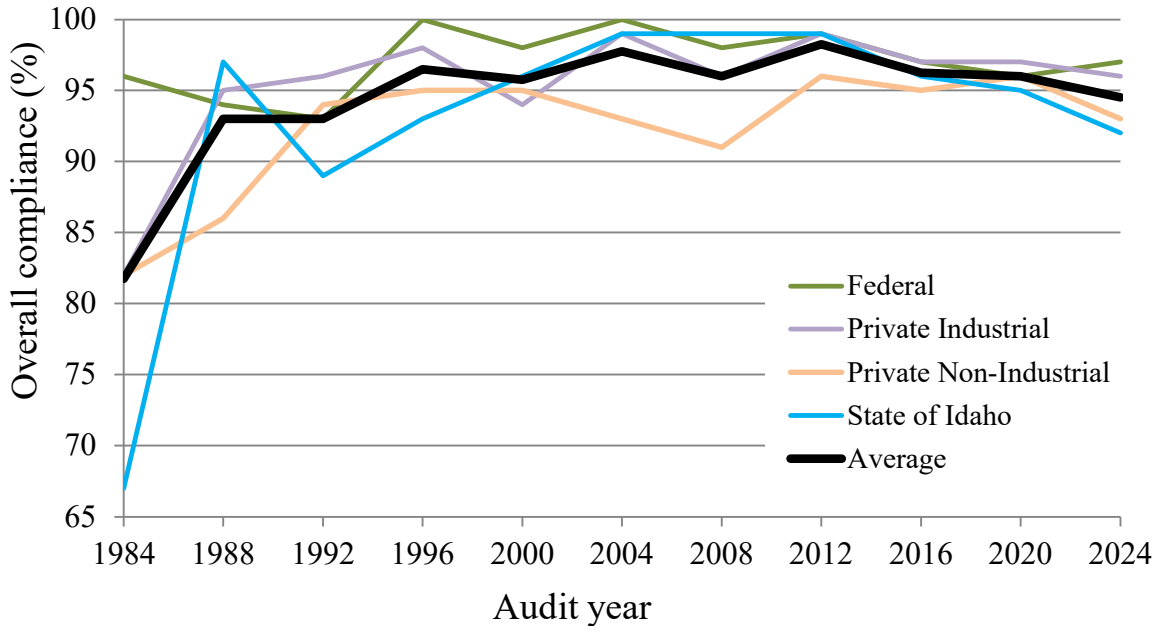

Figure 4. Overall compliance rates by landownership category across audit years.

Federal timber management typically requires large stream buffers (>150'). However, the historic road layout often includes roads that run very close to the stream.

3.1.3 Compliance by Rule Group

The rules are organized into five main groupings: general (020), harvest and stream protection (030), roads (040), reforestation (050), and chemicals (060). Compliance percentages ranged between 90% and 100% across rule groups (Table 3; Figure 5). The highest compliance rate was 'reforestation' rules, and the lowest was 'general' rules. The number of 'general' rules assessed was much lower than the other rule groups — only 58 total assessments. This meant that the six observed failures led to a high failure rate. Variances not offering equal resource protection caused two of the observed failures.

The 'chemical' rule group attained 94% compliance, a large increase from the 86% in the 2016 audit. Sites are being left cleaner; operators are removing grease tubes and oil buckets.

Table 3. Compliance rates by rule group.

IDAPA 20.02.01 Rule Group	Description	Applicable Instances	Complied	Percent
General rules (020)	Variances, permits, registrations	58	52	90%
Harvest and stream protection rules (030)	Skid trails, landings, slash, debris, shade, stream disturbance	921	882	96%
Road rules (040)	Construction, maintenance, culverts, berms, drainage	1,070	1,004	94%
Stocking rules (050)	Reforestation	96	96	100%
Chemical rules (060)	Chemicals and petroleum products	105	99	94%

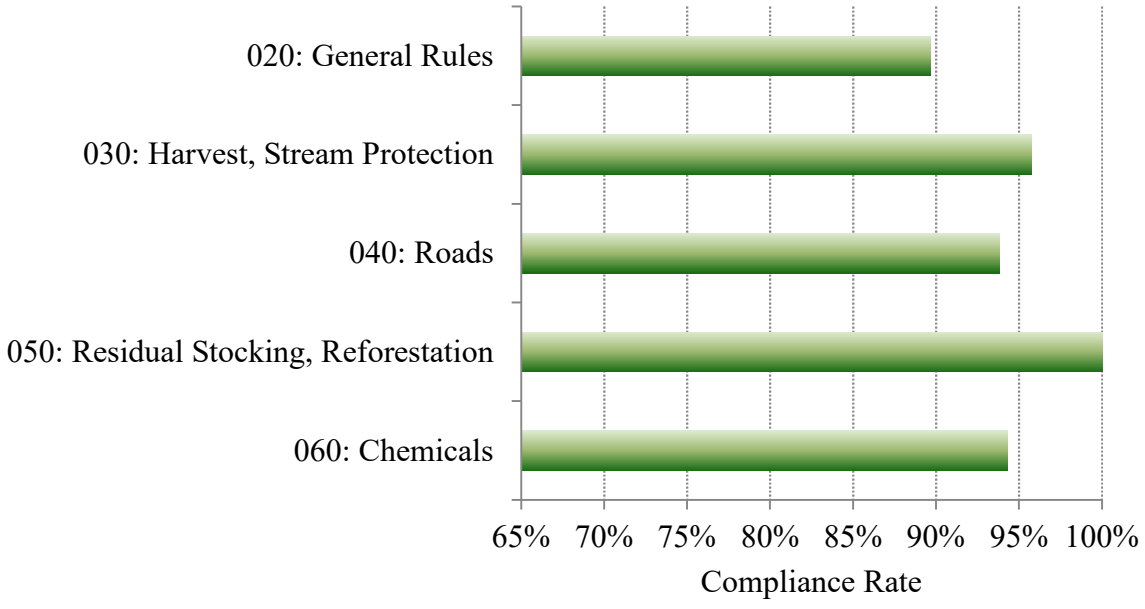

Figure 5. Compliance by rule group.

3.1.4 Compliance by Individual Rule

For convenience, the rules are divided into the five groups mentioned above. Each summary table in this section is ordered by rule number. A chart follows each rule group showing the relative compliance for each rule. Notes explaining the various situations are included. A detailed discussion follows in the next section.

General Rules (IDAPA 20.02.01.020)

The audit team assessed compliance with 10 general rules. Out of 58 instances, 52 were complying (Table 4; Figure 6).

Table 4. Summary of compliance with general rules.

IDAPA 20.02.01	Description	Instances	Complied	Not	Percent
010 49	Did tethered systems minimize soil disturbance?	8	8	0	100%
020 01aiii	Variance provides equal protection?	7	5	2	71%
020 01b	Was IDWR permit obtained, if required?	4	3	1	75%
020 01b	Was the pesticide registered for use in Idaho?	10	10	0	100%
020 01c	Diversions <25% and <65,170 gallons per day?	1	1	0	100%
020 01ciii	Water diversions screened appropriately?	2	1	1	50%
020 08	Did purchaser keep a copy of the notification?	26	24	2	92%
020 01ci	No diversions from canals and reservoirs?	0	0	0	n/a
020 01cii	Water district notified about diversion?	0	0	0	n/a
020 02	Vegetative cover within 1 year after conversion?	0	0	0	n/a

Note: Idaho Department of Water Resources (IDWR), not assessed (n/a). Also note that rule 010.049 is included in the 'general rules' section for convenience, since it is the only 'rule' to appear in the definitions (010) section.

Operators did not always implement the extra practices that variances required . For example, one variance permitted an operator to skid logs through the outer edge of an SPZ, provided the trail was grass-seeded. The variance was well-written, but the grass seeding never occurred. A different variance permitted reconstruction of a road during low water conditions, and yet operations began during spring runoff.

One variance was improperly granted for reconstruction of a road in a Class I SPZ. The variance's mitigation practices (installation of rock or straw) did *not* provide equal long-term protection to the resource, even if they had been installed properly.

This variance also required the operator to stabilize the creek bank with boulders. The activity required a stream channel alteration permit from the Idaho Department of Water Resources, which was not obtained. If an IDL forest practices advisor had been involved, they would likely have known this. A detailed discussion of variances follows later.

Although it is rarely encountered by the auditors, screening of water truck pumps to prevent fish entrainment continues its third audit cycle as the rule with the lowest compliance rate.

The rule requiring purchasers to keep a copy of the notification form has never been audited before. The two instances of non-compliance were technical, in that an intermediary held copies of the compliances instead of the initial purchaser. The intent of the rule — that mills only accept wood harvested under a compliance — was always met.

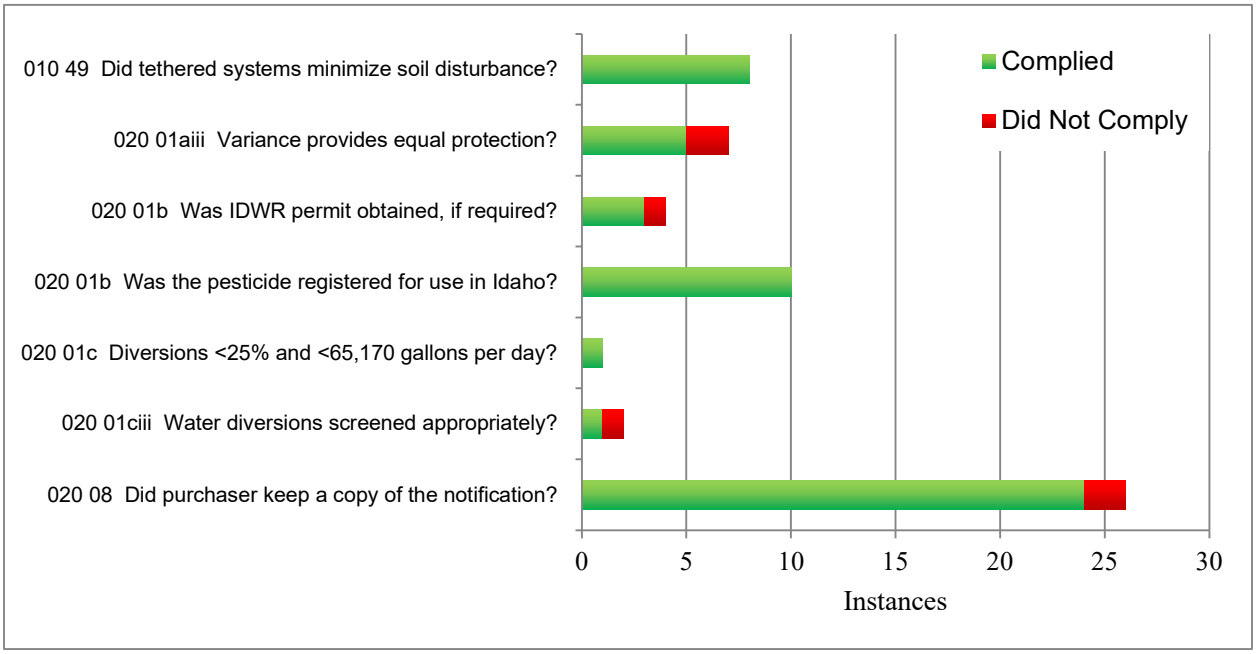

Figure 6. Summary of compliance with general rules.

Timber Harvesting and Stream Protection Rules (IDAPA 20.02.01.030)

The audit team assessed compliance with 41 harvest and stream protection rules. Out of 921 instances, they observed 39 cases of noncompliance involving 18 of these rules (Table 5; Figure 7). Seven violations were for piling slash inside the SPZ (030.07fii), and seven were for locating skid trails and landings inside an SPZ (030.04a). Notably, the auditors found the new 'shade rule' (030.07eii) was fully complied with. The only exception was related to removal of trees alongside an SPZ road under an inadequate and unenforced variance.

Table 5. Summary of compliance with harvest and stream protection rules.

IDAPA 20.02.01	Description	Instances	Complied	Not	Percent
030 03a	Did operations avoid causing rutting or erosion?	41	39	2	95%
030 03a	No ground-based equipment on slopes >45% near streams?	36	35	1	97%
030 03a	Notification identifies slopes >45%?	25	25	0	100%
030 03b	Constructed skid trail <30% on unstable soils?	27	26	1	96%
030 03c	Skid trails kept to minimum width and number	40	40	0	100%
030 03c	Skidding tractor sizes appropriate?	36	36	0	100%
030 03d	Erosion minimized during downhill cable yarding?	2	2	0	100%
030 04a	Landings and trails in stable areas outside of SPZ?	42	35	7	83%
030 04a	Skid and fire trails located to minimize sidecasting?	38	36	2	95%

IDAPA 20.02.01	Description	Instances	Complied	Not	Percent
030 04b	Size of landings appropriate?	36	36	0	100%
030 04c	No loose stumps nor excessive slash in landing filler?	7	6	1	86%
030 04c	Sidecasted landings properly stabilized?	6	5	1	83%
030 05a	Trail drainage and stabilization adequate and current?	42	39	3	93%
030 05b	Are landing drainage and stabilization adequate?	37	37	0	100%
030 06a	Slash immediately moved 5' above OHWM in Class I?	26	25	1	96%
030 06a	Trees felled away from Class I stream?	9	8	1	89%
030 06b	Slash moved above OHWM in Class II?	33	30	3	91%
030 06c	Trail waste deposited in stable location outside of SPZ?	35	33	2	94%
030 07b	Avoid skidding logs through streams?	41	41	0	100%
030 07b	Ends of stream-crossing skid trails water barred?	3	3	0	100%
030 07b	Number of stream crossings minimized?	44	44	0	100%
030 07b	Stream crossings have direct approaches?	22	22	0	100%
030 07b	Temporary stream crossings adequately sized?	4	4	0	100%
030 07b	Temporary stream crossings removed immediately?	3	3	0	100%
030 07c	Avoid ground-based equipment use in SPZ?	45	42	3	93%
030 07d	Stream disturbance minimized during cable yarding?	23	23	0	100%
030 07ei	Streamside shrubs, grasses and rocks remaining?	22	22	0	100%
030 07eii	Adequate tree counts retained in Class I streams?	10	9	1	90%
030 07eii5	If SPZ harvest, min tree count met in outer zone?	8	8	0	100%
030 07eiv	If SPZ harvest, min tree count met in inner zone?	8	7	1	88%
030 07ev	Were class II SPZs adequately stocked?	8	8	0	100%
030 07evi	Felled trees left as LOD in Class I?	8	7	1	88%
030 07evi	LOD, shade and filtering maintained in SPZ?	19	19	0	100%
030 07fi	Were hand piles >5' from OHWM?	4	4	0	100%
030 07fii	Mechanical piling of slash in SPZ avoided?	43	36	7	84%
030 08a	Prompt cleanup and regeneration in scenic areas?	3	3	0	100%
030 08b	Were fruit and berry shrubs preserved where practical?	26	26	0	100%
030 08c	Did operations avoid wet areas?	41	40	1	98%
030 08d	Wildlife cover available within 1/4 mile of clearcuts?	18	18	0	100%
030 07a	Lake site-specific plan for SPZ activities?	0	0	0	n/a
030 07evii	Felled trees smaller than LOD removed?	0	0	0	n/a

Notes: Stream protection zone (SPZ); large organic debris (LOD), ordinary high-water mark (OHWM), not assessed (n/a).

In one case, large amounts of slash in a stream contributed to the failure of a culvert. In another case, several Class II streams were ignored. While they may not have been flowing at the time and were not on the (outdated) area map, the streams were clearly identifiable by their bed and banks. They should have been protected. The audit team visited when the creeks were flowing, and the skid trails and slash piles in the SPZs had caused significant sedimentation of the creeks.

During the audit, discussions about the rule that prohibits mechanical piling in the SPZ (030.07fii) revealed an ambiguity. The rule reads, in part: "No mechanical piling of slash or natural forest fuels is allowed in an SPZ…" The word piling may suggest that large slash piles themselves are not a problem and that the rule is intended to address the presence of large machines in the SPZ. Given this potential ambiguity, the auditors decided to assign no violations to SPZ slash piles unless there was also evidence that the machine used to pile them was also in the SPZ. A discussion of a proposed rule modification to address this ambiguity follows in the next section.

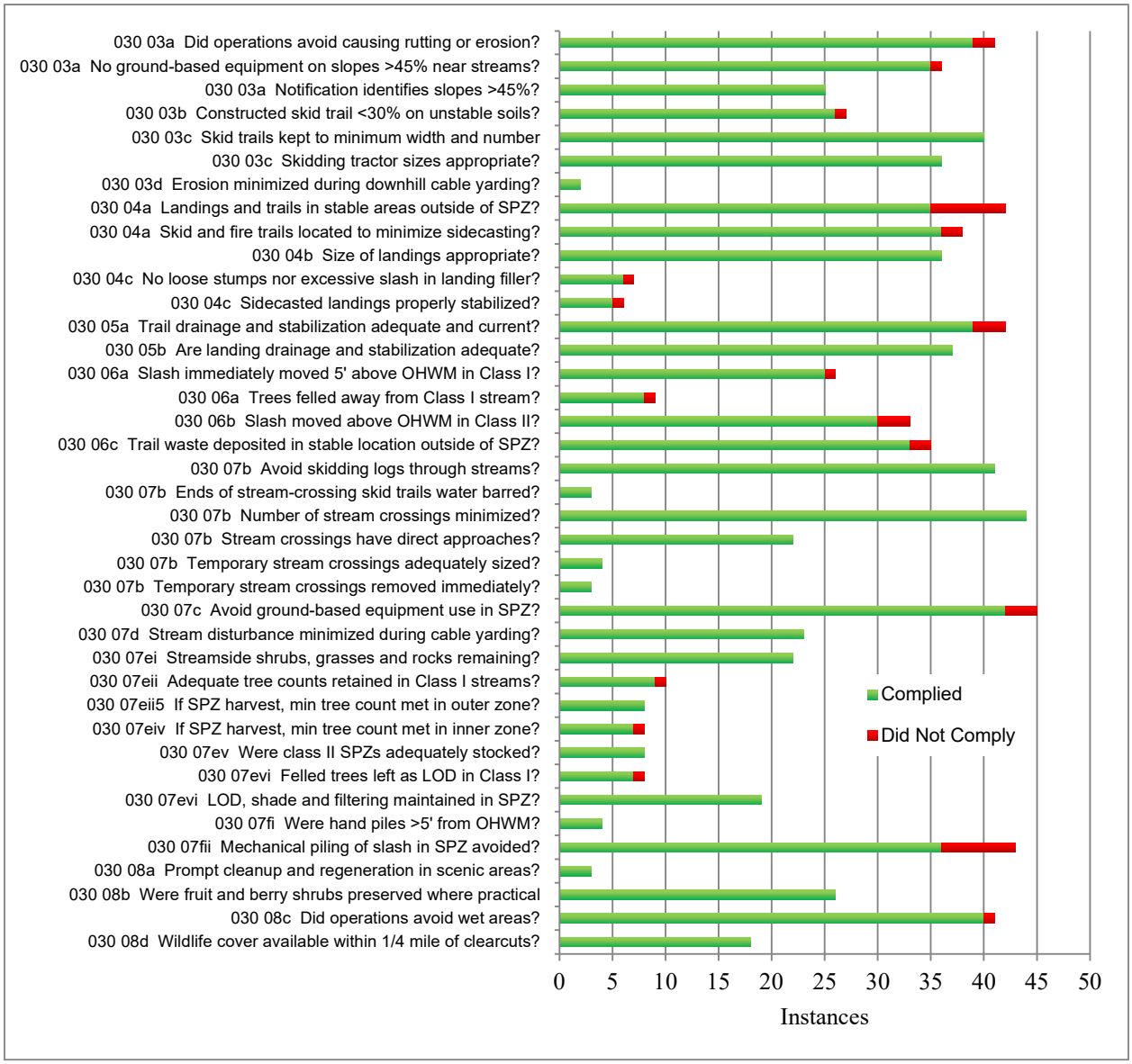

Figure 7. Summary of compliance with harvest and stream protection rules.

Road Rules (IDAPA 20.02.01.040)

The auditors assessed compliance with 55 road rules (Table 6; Figure 8) and observed 66 instances of noncompliance. These tended to fall into two categories: bare soil near streams and inadequate maintenance.

Table 6. Summary of compliance with road rules.

IDAPA 20.02.01	Description	Instances	Complied	Not	Percent
040 02a	Avoid road construction in SPZ?	42	42	0	100%
040 02a	Retain vegetation between roads and streams?	36	35	1	97%
040 02b	Cut and fill volumes minimized?	40	40	0	100%
040 02b	Road width appropriate?	41	41	0	100%
040 02c	Natural drainage features installed?	38	37	1	97%
040 02c	Natural drainage prioritized over culverts and ditches?	36	36	0	100%
040 02d	Are drainage culverts properly sized and bedded?	20	20	0	100%
040 02d	Culverts and ditches included where necessary?	24	22	2	92%
040 02d	Do culverts avoid discharge of sediment to streams?	20	18	2	90%
040 02ei	Do new culverts provide fish passage on C1 streams?	5	5	0	100%
040 02eii	Are culvert inlets >30" armored or flared?	7	7	0	100%
040 02eii	Are stream-crossing structures appropriately sized?	23	22	1	96%
040 02eiii	Are all relief culverts >12" in diameter?	20	20	0	100%
040 02g	Are fords cross-drained and rocked?	3	3	0	100%
040 02g	Avoid fords with gradient >4%?	6	6	0	100%
040 02g	Fording limited to low water or frozen conditions?	3	2	1	67%
040 02h	Avoid landing or skidding logs in existing SPZ roads?	42	41	1	98%
040 02h	Avoid reconstruction of roads in SPZ?	44	43	1	98%
040 03b	Road construction debris only outside SPZ and floodplain?	33	26	7	79%
040 03b	Was road construction debris cleared from drainages?	20	19	1	95%
040 03c	Was entire SPZ rocked through new class I crossings?	7	6	1	86%
040 03c	Were erodible materials near streams stabilized?	26	19	7	73%
040 03d	Has road fill material been properly compacted?	28	28	0	100%
040 03d	Were ice and stumps kept out of fills?	22	22	0	100%
040 03e	Has outslope drainage been retained and berms removed?	27	26	1	96%
040 03f	Are quarries properly drained?	3	3	0	100%
040 03g	Was fill erosion minimized?	22	19	3	86%
040 03g	Were drainage structures installed?	21	17	4	81%
040 03h	Was erosion-causing construction suspended during rain?	5	5	0	100%
040 03i	Was cut-slope material immediately stabilized/removed?	24	23	1	96%
040 03j	Are roads on erodible slopes >60% full benched?	6	5	1	83%
040 03j	Avoid fill slope disposal on erodible slopes >60%?	6	4	2	67%
040 04a	Is maintenance debris placed to avoid stream entry?	29	24	5	83%
040 04b	Have erosion sources to streams been repaired?	15	9	6	60%

IDAPA 20.02.01	Description	Instances	Complied	Not	Percent
040 04ci	Active roads: culverts and ditches functional?	32	29	3	91%
040 04cii	Active roads: shaped to minimize erosion?	34	32	2	94%
040 04ciii	Active roads: surface maintained to minimize erosion?	31	31	0	100%
040 04civ	Were surface-stabilizing chemicals kept out of streams?	18	18	0	100%
040 04cv	During maintenance in SPZ, were roads stabilized?	19	18	1	95%
040 04cv	Supplemental filtration at SPZ drainage outlets, if necessary?	5	2	3	40%
040 04d	Incidental haul roads maintained during active use?	14	14	0	100%
040 04ei	Are inactive ditches and culverts maintained?	32	31	1	97%
040 04ei	Are inactive road surfaces controlling erosion?	38	36	2	95%
040 04fi	Have long-term inactive road surfaces been decommissioned?	17	17	0	100%
040 04fiii	Are long term inactive bridges and culverts maintained?	10	9	1	90%
040 04g	Are abandoned drainage structures removed?	5	5	0	100%
040 04g	Are abandoned road surfaces properly treated?	14	14	0	100%
040 04gi	Are abandoned crossings restored to original gradient?	5	4	1	80%
040 04gii	Are abandoned road prisms uncompacted?	15	15	0	100%
040 04giii	Do abandoned SPZ fills have long-term stability?	4	4	0	100%
040 04giv	Are abandoned sidehill fills stable?	9	9	0	100%
040 04gv	Has erosion on abandoned ditch-lines been controlled?	11	11	0	100%
040 04gvi	Has bare soil from road abandonment been stabilized?	13	10	3	77%
040 02eii	Were culverts >120" engineered?	0	0	0	n/a
040 04ciii	Was sediment-causing hauling postponed during rain?	0	0	0	n/a

Notes: stream protection zone (SPZ); not assessed (n/a).

Bare dirt is an inevitable part of road construction. To protect water quality, rule 040.03b requires operators to remove erodible material generated by construction from vulnerable areas near SPZs. At six sales, the audit team found erodible piles of construction-related dirt left in the SPZ. On three occasions, the auditors also observed road debris sidecast directly into an SPZ, with sediment reaching the water.

Rule 040.03c requires operators to stabilize exposed material prior to seasonal runoff. On several sales, the auditors found steep culvert fills eroding toward the stream. This is one of the most vulnerable situations – steep, bare, loose dirt perched immediately above a stream. Early-season rain events can (and did) cause erosion of the fill into the stream. Sales that had immediately stabilized the fill slopes using seed, rock, or slash did not have this problem.

On three occasions, the auditors found that stream crossing culvert pipes were too short. This meant the fill had to be steeper than otherwise required, and often bare dirt reached to the very end of the pipe. This then encouraged erosion directly into the water.

The audit team found rule 040.04a (governing maintenance debris) violated five times. On most of these occasions, debris from cleaning culvert entrances was left immediately next to the stream, where it was vulnerable to being washed back into the stream. Twice, auditors found

road surface material from a grader piled into a long berm immediately on the streambank. Streams with a road running up the SPZ are particularly vulnerable to this problem. Grader operators should be careful to pull back disturbed material into the middle of the road.

040.04b requires repairing areas that are contributing sediment to streams. This rule was typically violated in recent sales where the operator had not stayed current with maintenance needs on active roads. Long-term maintenance of sites was generally good.

Rule 040.04gvi requires soil disturbed when roads are abandoned to be stabilized and not left in a raw state. Grass-seeding or laying a slash mat are suitable techniques. On three occasions, auditors found decommissioned roads left in a bare, erodible condition.

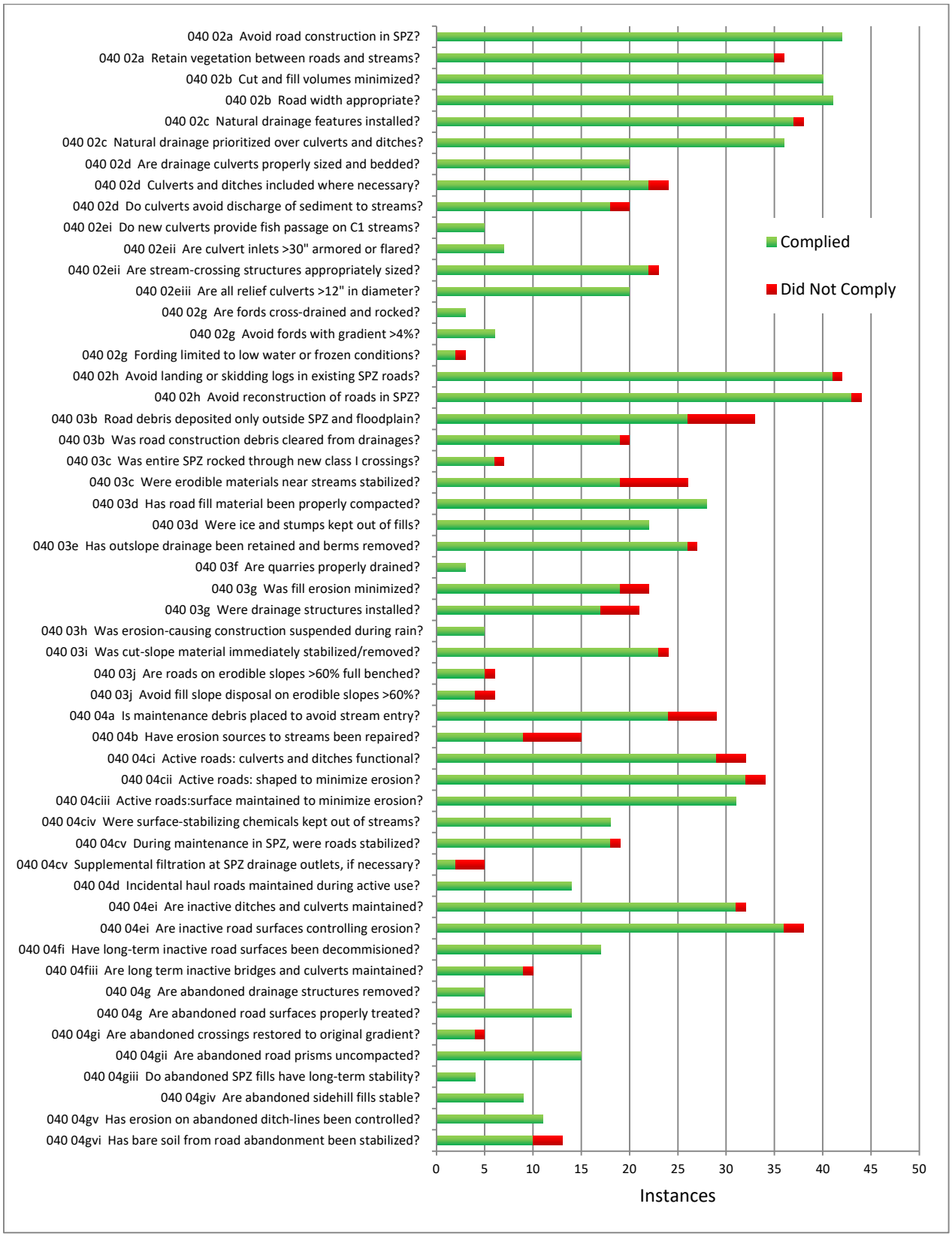

Figure 8. Summary of compliance with road rules.

Restocking and Replanting Rules (IDAPA 20.02.01.050)

The audit team assessed compliance with six restocking and replanting rules (Table 7; Figure 9) and found them fully complied with. Typically, landowners wanted to get a new stand of trees growing as soon as possible after harvest.

Table 7. Summary of compliance with restocking rules.

IDAPA 20.02.01	Description	Instances	Complied	Not	Percent
050 02	Are leave-trees of acceptable quality?	41	41	0	100%
050 03a	Did drier forests retain minimum stocking?	16	16	0	100%
050 04	Was residual stocking or replanting adequate?	37	37	0	100%
050 05b	Was replanting-exempt land protected with vegetation?	2	2	0	100%
050 03a	Were salvaged/converted drier forests replanted?	0	0	0	n/a
050 03b	Was landowner encouraged to restock drier forests?	0	0	0	n/a

Auditors did not see any examples of timber salvage or conversion in use. Nor did they observe dry forests that had failed to revegetate.

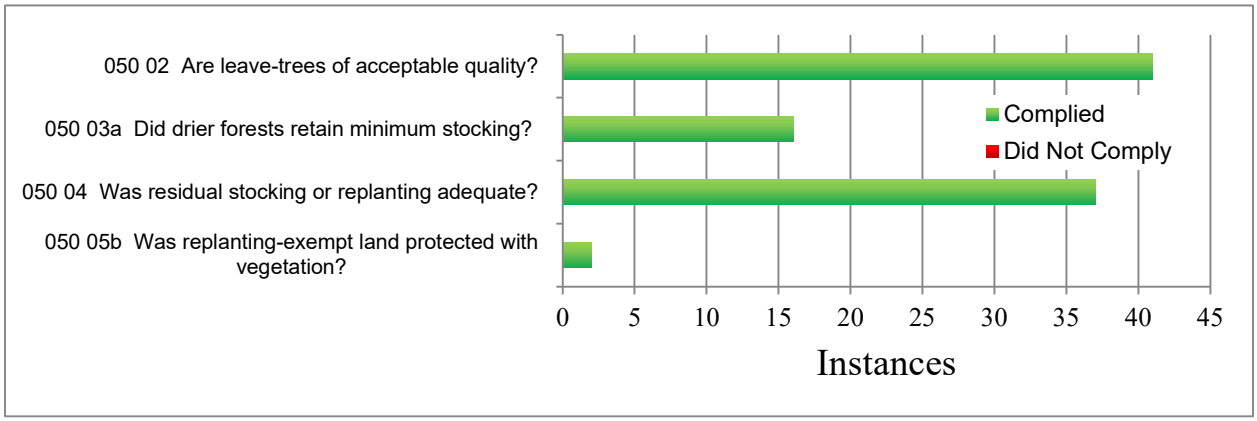

Figure 9. Summary of compliance with restocking rules.

Chemical and Petroleum Product Rules (IDAPA 20.02.01.060)

The audit team assessed compliance with 27 chemical and petroleum rules (Table 8; Figure 10). They observed six instances of noncompliance, which were mostly due to oil buckets and grease tubes being thrown into slash piles.

Table 8. Summary of compliance with chemical and petroleum product rules.

IDAPA 20.02.01	Description	Instances	Complied	Not	Percent
060 03	Did pesticide applicator have current Idaho license?	10	10	0	100%
060 03a	Were fuel transfers done away from water and attended?	3	2	1	67%
060 03b	Do tanks avoid petroleum leaks?	1	1	0	100%
060 03c	Was all non-biodegradable waste properly disposed of?	42	37	5	88%
060 05a	Was an airgap used when mixing chemicals with water?	3	3	0	100%
060 05bi	Were chemical landings located to avoid spills to water?	3	3	0	100%
060 05bii	Was equipment washout water properly disposed of?	4	4	0	100%
060 06a	Aerial pesticide: 100' untreated from water?	3	3	0	100%
060 06c	Was application shut off during turns?	3	3	0	100%
060 07a	Ground pest: 25' untreated from water?	3	3	0	100%
060 08b	Hand: were chemicals kept out of all water sources?	2	2	0	100%
060 09a	Were chemicals applied in accordance with the label?	2	2	0	100%
060 09b	Were chemicals applied at allowable rates?	3	3	0	100%
060 09c	Were chemicals kept out of water?	1	1	0	100%
060 10a	Daily pesticide record - were proper records kept?	9	9	0	100%
060 11	Were all pesticide and fertilizer containers removed?	13	13	0	100%
060 03	Does impervious catchment > 110% storage volume?	0	0	0	n/a
060 03	If petroleum spilled to water, was IDL notified?	0	0	0	n/a
060 03	Are large petroleum containers stored >100' from water?	0	0	0	n/a
060 04	Was all chemical equipment leak-proof?	0	0	0	n/a
060 06a	Aerial fertilizer: 50' untreated from water?	0	0	0	n/a
060 07b	Ground fertilizer: 10' untreated from water?	0	0	0	n/a
060 10b	Daily fertilizer record - were proper records kept?	0	0	0	n/a
060 12a	Were spills reported to IDL immediately?	0	0	0	n/a
060 12b	Were spills controlled and contained immediately?	0	0	0	n/a
060 12c	Were spills appropriately removed?	0	0	0	n/a
060 13	Were chemical misapplications immediately reported?	0	0	0	n/a

Although the five violations of 060.03c were a massive improvement from 2016 (38 violations of this rule), they represent a regression from only 2 violations in 2020. IDL forest practices advisors should continue to ensure operators do not discard petrochemical waste into slash piles.

The remaining violation occurred when an equipment operator refueled a skidder that was parked on the streambank.

The audit team observed no large petroleum storage tanks this year, and with no documented leaks, this section had a lot of 'not assessed' rules.

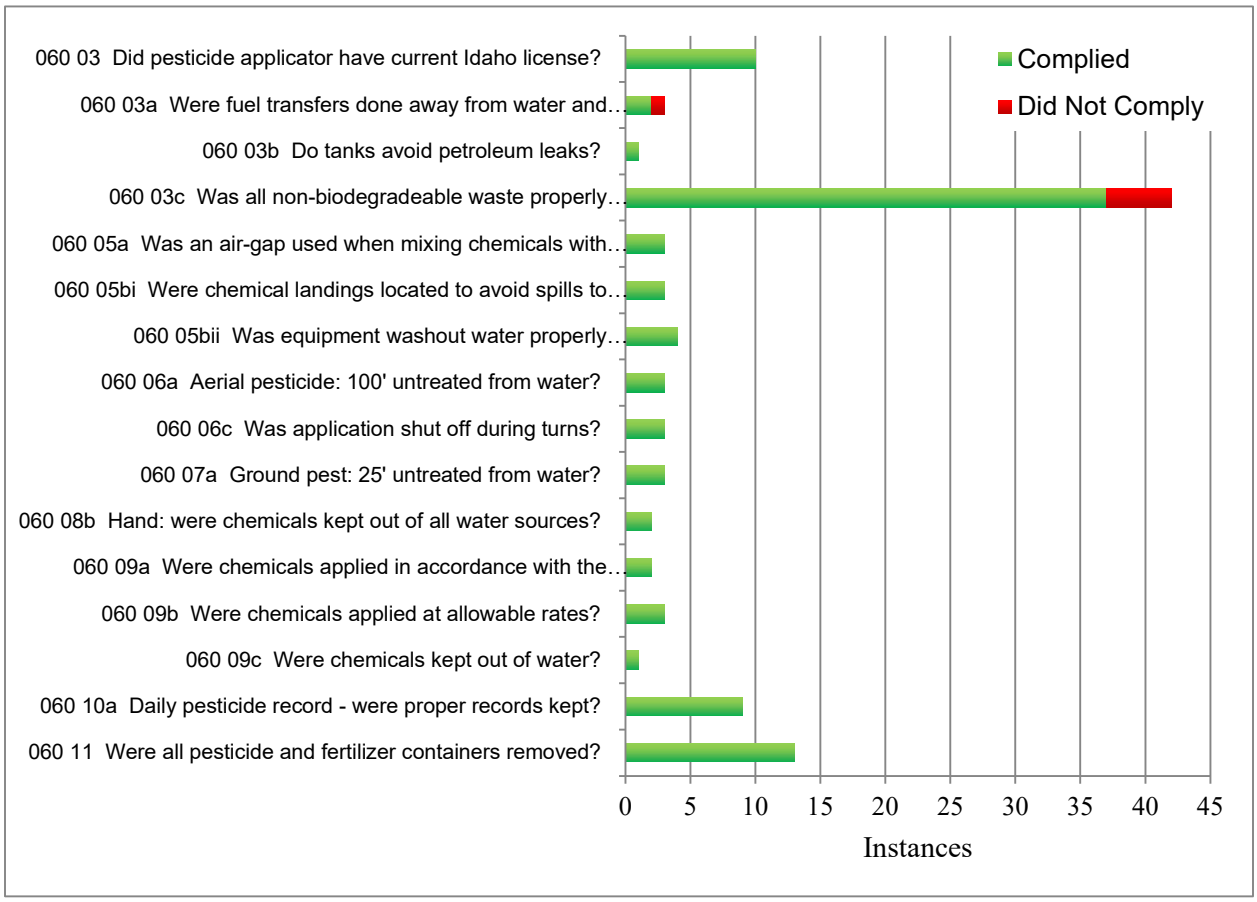

Figure 10. Summary of compliance with chemical and petroleum product rules.

3.1.5 Compliance Distribution

Instances of noncompliance with FPA rules were not spread evenly across the sales. For example, the overall compliance rate of 95% does *not* imply that most sales had a 5% noncompliance rate. In fact, 25 of the 58 sales visited had no violations at all. Of these 'flawless' sites, ten were on private industrial ground, six were on federal ground, five were on state ground, and four were on private non-industrial ground. About three quarters (71%) of the sites had two or fewer violations.

Although the absolute number of violations need not necessarily correspond to their severity, the auditors found that it was usually a good guide. The sites with the highest number of violations almost always correlated with those that posed the highest risk to water quality.

One third of the violations were incurred by only three of the sites (the "bad apples").

Notably, state timber sales accounted for three of the four sites with the highest number of violations.

Figure 11 shows how the violations were distributed across the 58 audit sites.

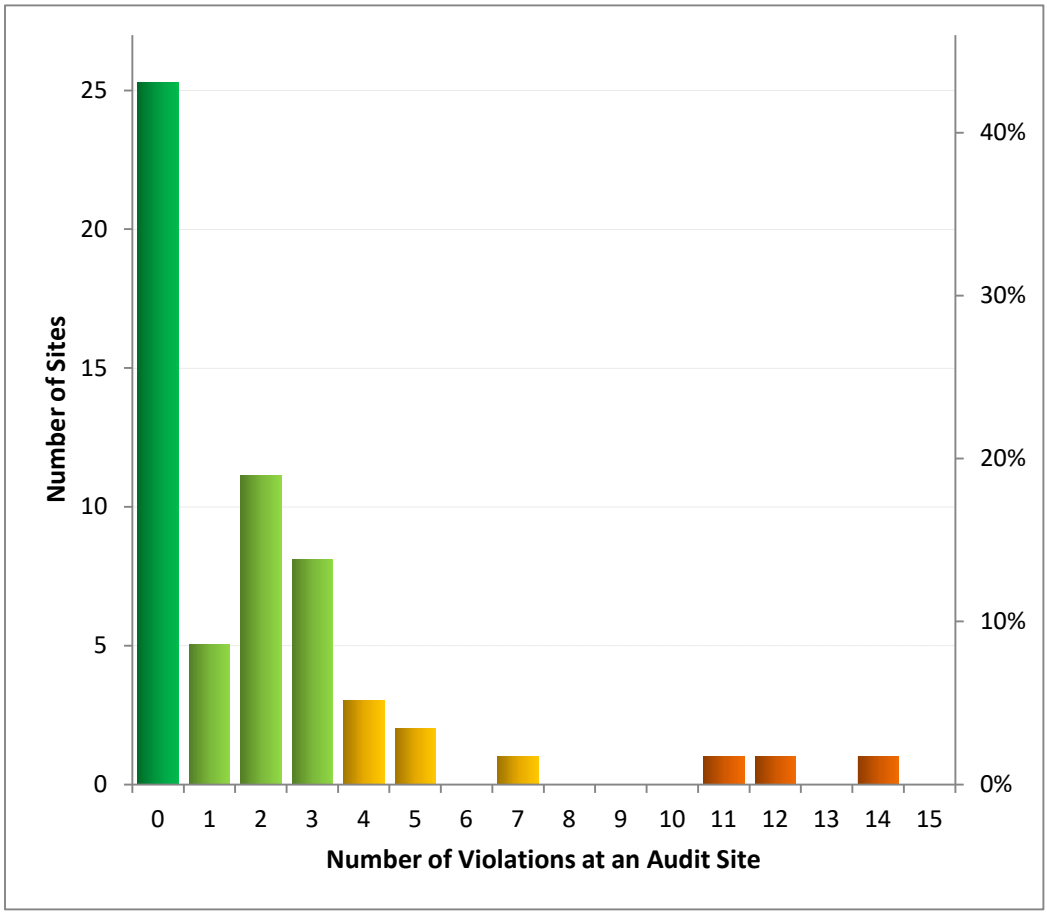

Figure 11. Distribution of compliance.

3.2 Compliance Summary

The 2024 audit data indicate that although average compliance rates remain fairly high (95%), there is a growing discrepancy between ownerships. For the second cycle running, state-owned land (92%) had the lowest compliance rate. The reasons for this are discussed earlier and may be related to the high turnover and vacancy rates that certain IDL area offices have experienced in their foresters and forest practices advisors.

As with the previous three audit cycles, federal and private industrial forests showed the highest level of compliance (>96%).

Of the five new Class I culverts auditors examined, all provided fish passage. The “shade rule” (030.07eii) was complied with on 9 out of 10 occasions. This is excellent news and a notable improvement from the previous audit.

4 Recommendations

The main source of damage to water quality is noncompliance with the rules (see above). If operators fully complied with the rules, water quality would be largely unimpaired by timber harvest. *In other words, the rules are generally effective when followed.*

DEQ offers the following suggestions to IDL to improve the implementation of the Forest Practices Act and ensure water quality is preserved:

4.1 Bare Dirt

The most common problem in 2024 was piles of bare dirt being left near streams. In combination, rules 030.06c, 040.03b, 040.03c, 040.04a and sometimes 040.04gvi, were violated a total of 24 times: about 20% of the total violations. These rules require sediment created during road maintenance and construction (such as grader piles, ditch cleanings, and culvert debris) to be left in a manner such that it will not enter streams during high water or heavy rain. *Forest practices advisors should pay attention to unstable bare dirt located anywhere near a stream.*

4.2 Equipment Use in the SPZ

Equipment use in the SPZ was the second most common problem. In combination, rules 030.07fii (piling of slash), 030.07c (ground-based equipment), 030.04a (landings and trails), and 040.02h (landing and skidding) were violated a total of 19 times, accounting for 16% of the total. Federal land had no violations of this rule. Auditors found most violations on private nonindustrial ownership. Luckily, the violations were usually minor, on the outer edges of the SPZ, and rarely contributed to water quality problems. *IDL should continue to educate private non-industrial landowners about the importance of keeping equipment out of the SPZ.*

4.3 Inspection of State Lands

IDL policy intends the inspection and oversight process to be equal between state and private lands. Specifically, IDL's forest practices advisors (formally titled 'Private Forestry Specialists') are supposed to oversee and inspect both categories of land equally. This ensures fair treatment across landownerships and also allows for a degree of independence from the harvesting division of the state. This policy is generally followed, and the state or private forester typically works with the forest practices advisor to oversee and critique the operation.

However, in several of the state sales observed by the audit team, IDL staff stated that there was no forest practices advisor involved. As a result, oversight was noticeably less thorough. For example, auditors found two variances whose terms were not followed, and in one situation, the variance itself was incomplete and inadequate. Forest practices advisors are in

the best position to oversee compliance on all landownerships because they are the most familiar with the rules.

IDL should ensure that forest practices advisors are involved with timber sales on state land to the same extent as private land, especially when variances are concerned.

4.4 Variances in General

Variances are an extremely valuable tool. They provide a way to solve unexpected or unusual problems, thereby allowing the rest of the rules to be simple. The auditors usually found variances to be well-written and protective. However, when done improperly, especially near streams, the resource damage can be significant.

The variance rule (020.01aiii) states that the practices "must provide for results over the long term which are equivalent or better *than those from rule*…" When approving a variance, a general statement of 'less resource damage' (such as reusing an SPZ road instead of building two new ones) is not appropriate. When a variance is granted, *mitigating conditions must be placed upon the varied rule* that directly address any additional resource damage, regardless of how much other disturbance might be avoided in the aggregate. These conditions often take the form of extra seeding and stabilization, extra tree retention, extra drainage control, or seasonal restrictions. Said another way: although avoiding overall resource damage is a good idea, it does not relieve the operator's responsibility to mitigate the varied rule.

Variance documents should anticipate every rule that is to be varied. For example, a variance of rule 040.02h that allows decking of logs in an SPZ does not imply that rule 030.07fii (mechanical piling of slash in SPZ) is also varied. Both rules must appear in the variance, and both must be adequately mitigated.

In short, the variance process needs to be more thorough. These are the basic requirements of a variance:

1. Variance documents need to specify every rule that will be varied.
2. For each varied rule that could lead to increased risk or damage to the resource, the document should spell out how that risk or damage will be avoided or mitigated. This should specifically contemplate additional sediment and temperature inputs to streams.
3. If extra practices are required, these must be spelled out clearly.
4. There should be follow-up to ensure that the extra practices were implemented.

4.5 Removal of SPZ Trees Concurrent with Road Reconstruction

According to rule 030.07e.viii (the 'shade rule'), any variation of the tree retention requirements in fish-bearing streams must take the form of a 'site-specific riparian management prescription'. However, the auditors found that road-related variances sometimes allowed removal of roadside SPZ trees without any consideration of shade. For example, when

constructing or reconstructing a road in the SPZ (rules 040.02a and 040.02h), trees are often removed for safety and accessibility. With a road filling much of the SPZ, there is already a significant reduction in shade, and further removal will exacerbate the situation.

Typically, the variances allowing this type of incidental tree removal provide excellent sediment mitigation (extra rock, filtration) but do not contemplate that tree removal might sometimes cause extra solar input. Even if the situation does not merit a full site-specific riparian management plan, the variance must address the potential resource damage (extra solar input to the creek) and mitigate it by, for example, requiring extra trees be retained in another section of the SPZ.

Any variance that removes trees in an SPZ should follow the standard variance rubric and provide equal long-term protection to the resource, in terms of both sediment and temperature.

4.6 Screening of Diversions

The requirement to screen water diversions (020.01ciii) was a rarely assessed rule, because the auditors were generally not present to observe the tanker trucks withdrawing water. The rule was only assessed once in each of the 2016 and 2020 audits. However, it was violated both times. In 2016 the screen mesh size was too large, and in 2020 there was no screen. Auditors assessed the rule twice in 2024 and found one operator missing a screen, again finding the rule violated. Fish can be accidentally sucked into the tanker: a serious problem where threatened and endangered species are present. *IDL should contact water truck operators and ensure they are familiar with the screen requirements.*

5 Rule Effectiveness and Improvement

As stated above, the rules are generally effective in protecting water quality. However, the auditors found a few situations where they were inadequate or ambiguous. In these situations, DEQ recommends that IDL change the rule to provide more protection and clarity. Changing rules can be a slow process, so updating the Forest Practices Guidance (IDL 2022) would be a good interim solution.

5.1 Stabilization of Fills

One of the greatest risks to water quality is unstable fill material eroding into the creek. The risk is particularly acute at new stream crossings, as found on six sites this summer. Presently, rule 040.03c requires the operator to "…stabilize exposed material (road surface, cut slopes, fill slopes, borrow pits, waste piles, etc.) prior to seasonal runoff."

On several sites, auditors saw the evidence of early-season rains eroding the new fills into the creek. Although end-of-season stabilization is generally acceptable, auditors recommend that

the fill be stabilized as soon as practical in high-risk situations. The stabilization method is defined elsewhere in the rules.

The precise language of the rule should be determined by the Forest Practices Advisory Committee (FPAC), but a simple addition to rule 040.03c, such as **"Stabilize erodible fills in SPZs as soon as practical."** would suffice.

5.2 Culvert Length

On three occasions this year, the audit team observed new stream crossings with culvert pipes that were too short. This meant the fill had to be steeper than otherwise required, and bare dirt often reached to the very end of the pipe, perched above the stream. This encouraged erosion directly into the water. Suitable solutions to this problem are to build the fill out of boulders, which do not erode, or use a longer pipe.

The only rule that talks about culvert length is 040.02d, and even then, it only uses the word 'sizing', which is mostly interpreted girthwise. Furthermore, the rule's first and third sentences imply that it may only apply to relief pipes rather than stream crossings:

> When natural drainage will not protect the surface, cut slopes or fill slopes, plan roads with relief culverts and roadside ditches. Install culverts to prevent erosion of the fill by properly sizing, bedding and compacting. Ensure drainage structures avoid direct discharge of sediment into streams.
> (Idaho Code § 040.02d)

The stream-crossing rules in 040.02e again only address culvert diameter, and do not require proper bedding and compacting.

Taken together, it appears that the rules do not directly ensure culverts are the right length to avoid erosion into the stream. To solve this confusion, the auditors recommend two changes:

1. Add a clause to 040.02e (the stream crossing rules) that requires culvert pipes to be long enough to prevent direct erosion of the fill into the stream.
2. Move the middle sentence of 040.02d "Install culverts to prevent erosion of the fill by properly sizing, bedding and compacting." to section 040.03 because that section deals with road construction rather than planning. By separating this sentence from the section dealing with relief pipes, it clarifies that all culverts should also be properly sized.

5.3 Variances

When it issues a variance, IDL often includes mitigating conditions that will ensure equal long-term protection of the resource. Auditors observed a high level of compliance with variance conditions but during the audit noticed that the rules lack a *requirement* for this compliance. This simple omission can be easily corrected by amending as follows:

020.01 Compliance. Operators must comply with practices contained within a rule **or variance** to accomplish the purpose of the rule.

5.4 Slash Piles in the SPZ

Rule 030.07fii ("No mechanical piling of slash or natural forest fuels is allowed in an SPZ…"), when viewed in isolation, is ambiguously worded because it prohibits piling of slash in the SPZ, but not the slash piles themselves. (A later clause and other rules arguably remove the ambiguity, but it still confused the auditors). To be clear — large piles of forest fuels in the SPZ are not acceptable. When they are burned, the fire destroys riparian vegetation and makes the soil vulnerable to erosion. In practice, IDL inspectors and private foresters do not allow large slash piles within the SPZ.

To remove the ambiguity, the audit team recommends altering the above portion of rule 030.07fii to say "**Mechanically constructed piles of fuel are not allowed in an SPZ…**"

5.5 Hardwoods Counting as Retained Trees

Auditors observed full compliance with the replanting rules. On several sales, landowners chose to leave mature hardwoods near SPZs. However, despite providing wildlife habitat and excellent shade, these do not count as retained tree stocking because they are not defined as a 'marketable' tree species. In a previous audit, a landowner was trying to restore a native ecosystem, and replanted aspen trees, which also fell afoul of this requirement. For their extra shade and wildlife benefits, the rules should not discourage landowners from retaining mature hardwoods. Consider modifying the definition of 'Acceptable Tree Species' (010.02) to "Any tree species normally marketable in **or native to** the region, which are suitable to meet stocking requirements..."

5.6 Tree Retention in Class II Streams

There has been ongoing discussion in FPAC meetings about whether Class II streams should have a tree retention requirement to protect water temperatures. There was previously such a requirement in the prior version of the shade rule, and IDL has made a commitment to investigate the issue.

Since the last audit report, two studies have reported results on Class II harvesting. These studies, while not perfectly replicating Idaho conditions, suggest that clear-felling Class II streams can significantly increase their temperature, at least in certain circumstances:

> Water temperature increased post-harvest, with the greatest change occurring during the July–August period. Maximum daily temperature increased at most locations throughout the streams and was often elevated from April through October. (McIntyre 2018, page 7-4)
>
> Overall, our observations of moderate decreases in riparian shade and an increase in the seven-day average daily temperature response of up to 0.6°C after harvest following current Washington Forest

> Practices rules are consistent with recent scientific literature of contemporary forest practices. The dominant factor in higher temperatures was the loss of canopy closure. (Ehinger 2021, page 4-48)

Temperature in Class II streams is complicated, and the extra heat gain from canopy removal can sometimes be counteracted by increased hyporheic flow. However, there is ample evidence that clearcut harvest of Class II streams can sometimes result in significant temperature increases. It is important that this extra temperature does not find its way into Class I (fish bearing) streams.

Interestingly, the 'Hard Rock' study showed that much of the temperature increase could be reversed by allowing the stream to flow through an unharvested section:

> Below the harvest unit, maximum daily temperature showed signs of recovery toward preharvest conditions with the mean monthly maximum daily temperature decreasing by 0.3°C to 3.2°C after flowing through approximately 100 m of unharvested forest. (McIntyre 2018, page 7-4)

This formula is similar to the 'SRBA' rules that the state used for several years in the 2000's and 2010's and may form a promising basis of an eventual rule.

In the face of strong evidence that clearcutting Class II streams sometimes causes temperature increases that may be passed on to Class I streams, the auditors encourage FPAC and IDL to continue to formulate a practical, evidence-based Class II tree retention policy.

5.7 Temperature TMDL streams

Some streams are subject to DEQ temperature management plans, called total maximum daily loads (TMDLs). These are streams that have been identified as not meeting temperature criteria.

TMDL targets for nonpoint sources such as forestry require only voluntary compliance. A simple improvement might be for IDL to notify landowners that their proposed harvest area contains a temperature-impaired stream. This could be part of the GIS system that landowners use when they take out a harvest compliance. Knowing that their streams are particularly important for temperature might encourage voluntary tree retention. DEQ can provide IDL with a list of such streams.

6 Special Investigation — Shade Recovery Study

The quadrennial audit is often paired with a pilot project. For example, in 2020, eDNA sampling assessed the accuracy of stream classification. In 2024, the DEQ auditor collected data to assess the rate of shade recovery after riparian harvest.

From 2017–2019, DEQ and IDL conducted a 'shade study' to determine whether the riparian harvest rules preserved acceptable levels of shade. These riparian sites were harvested to the maximum extent permissible by rule, and extremely detailed shade measurements were taken

pre- and post-harvest. Now, six years later, repeat shade measurements can show how completely shade has recovered.

Some of the original sites are no longer appropriate for comparison, having been affected by adjacent timber harvest or wildfire. The DEQ auditor visited all 26 sites suitable for re-measurement over the summer. At each site, the shade was measured using the Solar Pathfinder device at the identical locations used in the original study.

The travel schedule for the quadrennial audits provided an excellent opportunity to collect the shade data. A plan and budget for analyzing the shade data have not been established yet.

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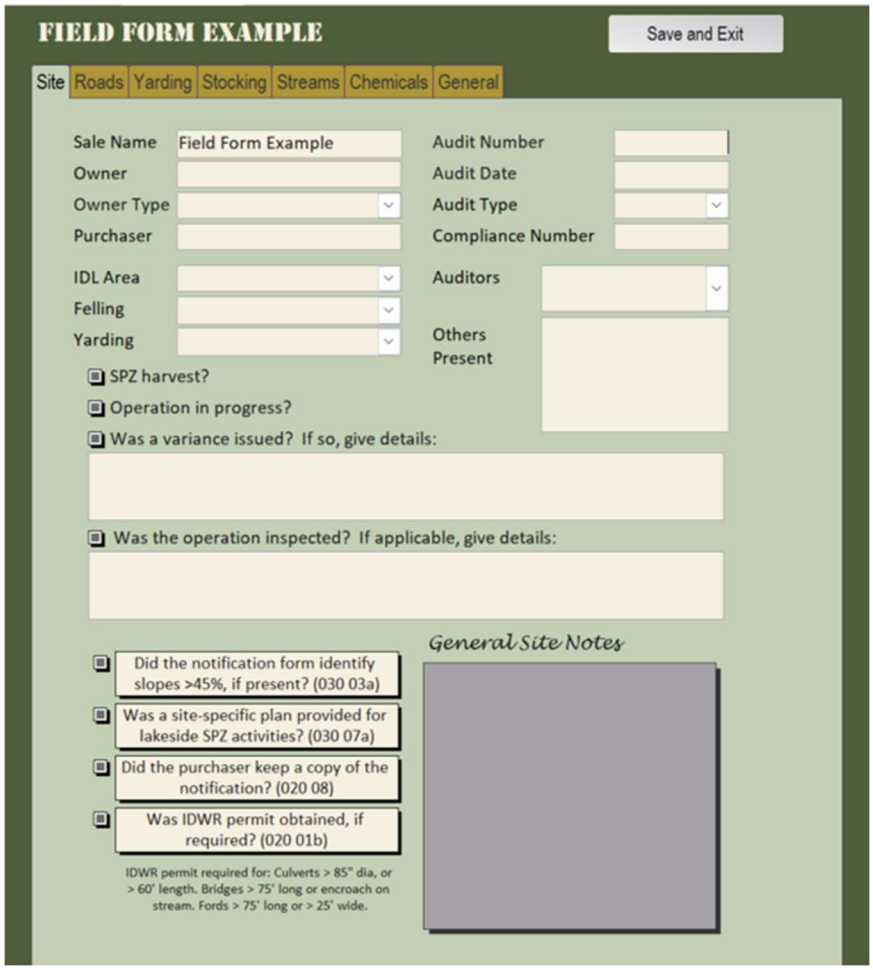
Appendix A. Idaho Forest Practices Rules Audited in 2024

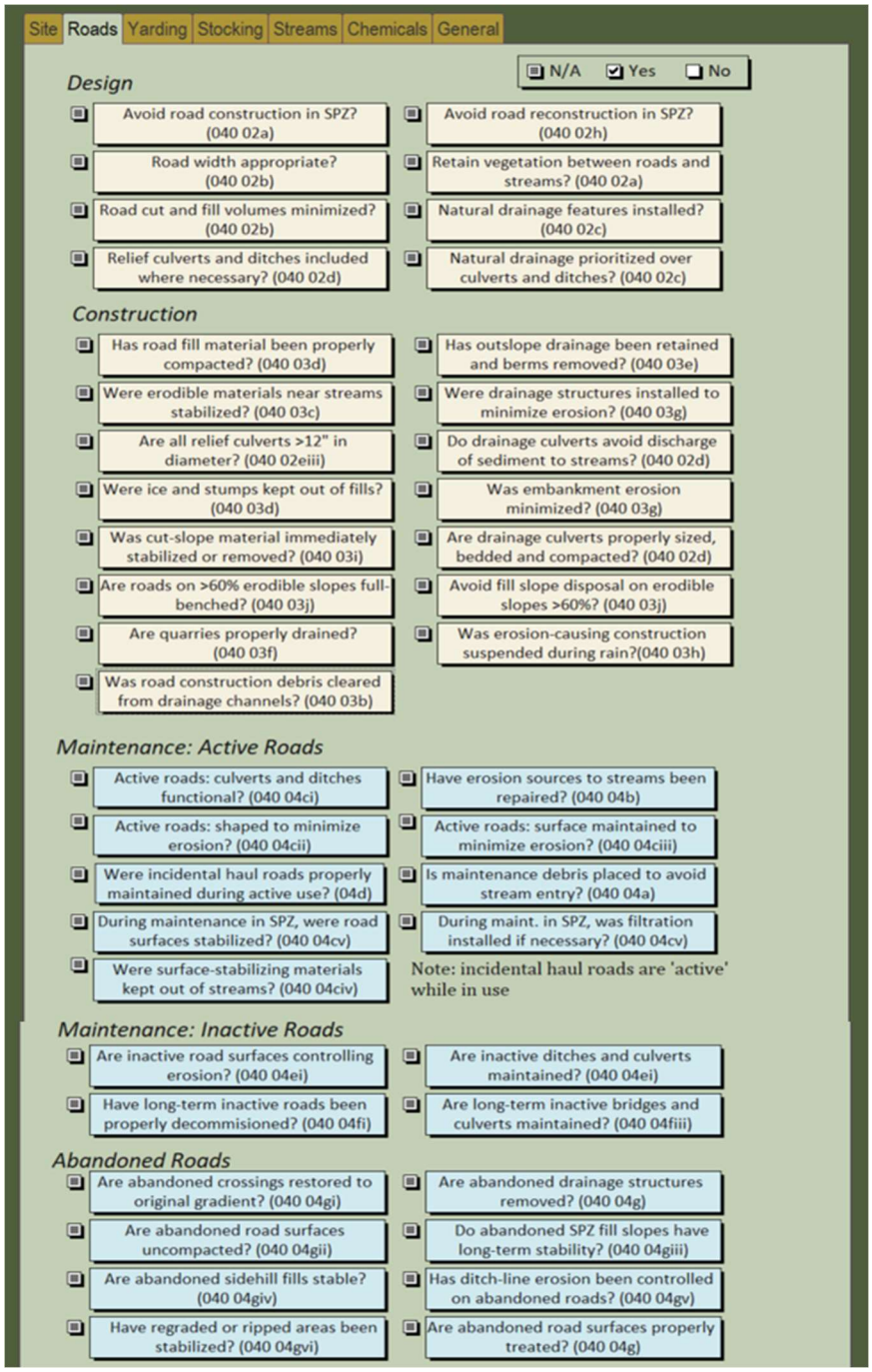
IDAPA 20.02.01 Rule	Rule Group	Description
010 49	Definitions	Did tethered systems minimize soil disturbance?
020 01aiii	General	Variance provides equal protection?
020 01b	General	Was IDWR permit obtained, if required?
020 01b	General	Was the pesticide registered for use in Idaho?
020 01c	General	Diversions <25% and <65,170 gallons per day?
020 01ci	General	No diversions from canals and reservoirs?
020 01cii	General	Water district notified about diversion?
020 01ciii	General	Water diversions screened appropriately?
020 02	General	Vegetative cover within 1 year after conversion?
020 08	General	Did purchaser keep a copy of the notification?
030 03a	Harvest	Did operations avoid causing rutting or erosion?
030 03a	Harvest	No ground-based equipment on slopes >45% near streams?
030 03a	Harvest	Notification identifies slopes >45%?
030 03b	Harvest	Constructed skid trail <30% on unstable soils?
030 03c	Harvest	Skid trails kept to minimum width and number
030 03c	Harvest	Skidding tractor sizes appropriate?
030 03d	Harvest	Erosion minimized during downhill cable yarding?
030 04a	Harvest	Landings and trails in stable areas outside of SPZ?
030 04a	Harvest	Skid and fire trails located to minimize sidecasting?
030 04b	Harvest	Size of landings appropriate?
030 04c	Harvest	No loose stumps nor excessive slash in landing filler?
030 04c	Harvest	Sidecasted landings properly stabilized?
030 05a	Harvest	Trail drainage and stabilization adequate and current?
030 05b	Harvest	Are landing drainage and stabilization adequate?
030 06a	Harvest	Slash immediately moved 5' above OHWM in Class I?
030 06a	Harvest	Trees felled away from Class I stream?
030 06b	Harvest	Slash moved above OHWM in Class II?
030 06c	Harvest	Trail waste deposited in stable location outside of SPZ?
030 07a	Harvest	Lake site-specific plan for SPZ activities?
030 07b	Harvest	Avoid skidding logs through streams?
030 07b	Harvest	Ends of stream-crossing skid trails water barred?
030 07b	Harvest	Number of stream crossings minimized?
030 07b	Harvest	Stream crossings have direct approaches?
030 07b	Harvest	Temporary stream crossings adequately sized?
030 07b	Harvest	Temporary stream crossings removed immediately?
030 07c	Harvest	Avoid ground-based equipment use in SPZ?
030 07d	Harvest	Stream disturbance minimized during cable yarding?
030 07ei	Harvest	Streamside shrubs, grasses and rocks remaining?
030 07eii	Harvest	Adequate tree counts retained in Class I streams?
030 07eii5	Harvest	If SPZ harvest, min tree count met in outer zone?
030 07eiv	Harvest	If SPZ harvest, min tree count met in inner zone?
030 07ev	Harvest	Were class II SPZs adequately stocked?
030 07evi	Harvest	Felled trees left as LOD in Class I?
030 07evi	Harvest	LOD, shade and filtering maintained in SPZ?
030 07evii	Harvest	Felled trees smaller than LOD removed?
030 07fi	Harvest	Were hand piles >5' from OHWM?
030 07fii	Harvest	Mechanical piling of slash in SPZ avoided?
030 08a	Harvest	Prompt cleanup and regeneration in scenic areas?
030 08b	Harvest	Were fruit and berry shrubs preserved where practical
030 08c	Harvest	Did operations avoid wet areas?
030 08d	Harvest	Wildlife cover available within 1/4 mile of clearcuts?

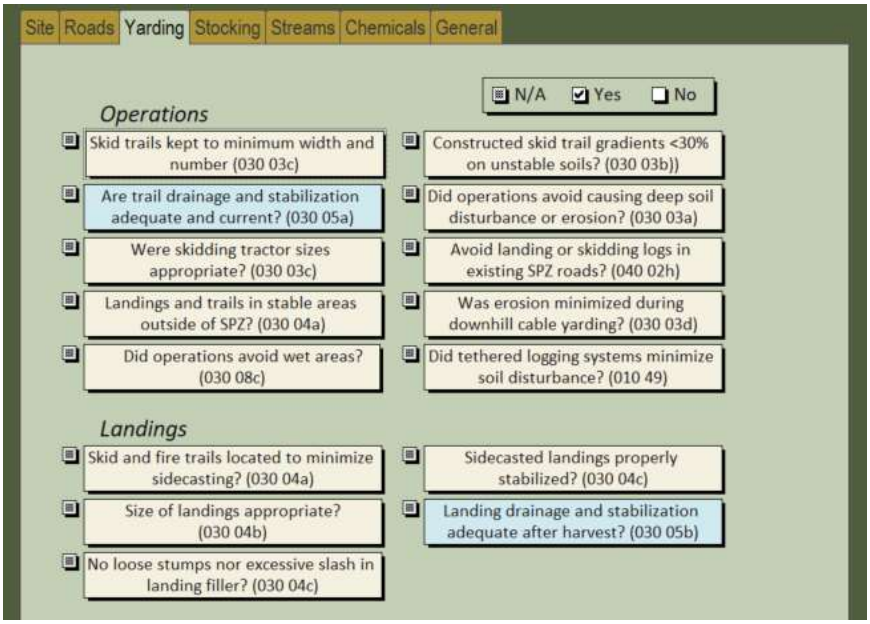
IDAPA 20.02.01 Rule	Rule Group	Description
040 02a	Roads	Avoid road construction in SPZ?
040 02a	Roads	Retain vegetation between roads and streams?
040 02b	Roads	Cut and fill volumes minimized?
040 02b	Roads	Road width appropriate?
040 02c	Roads	Natural drainage features installed?
040 02c	Roads	Natural drainage prioritized over culverts and ditches?
040 02d	Roads	Are drainage culverts properly sized and bedded?
040 02d	Roads	Culverts and ditches included where necessary?
040 02d	Roads	Do culverts avoid discharge of sediment to streams?
040 02ei	Roads	Do new culverts provide fish passage on C1 streams?
040 02eii	Roads	Are culvert inlets >30" armored or flared?
040 02eii	Roads	Are stream-crossing structures appropriately sized?
040 02eii	Roads	Were culverts >120" engineered?
040 02eiii	Roads	Are all relief culverts >12" in diameter?
040 02g	Roads	Are fords cross-drained and rocked?
040 02g	Roads	Avoid fords with gradient >4%?
040 02g	Roads	Fording limited to low water or frozen conditions?
040 02h	Roads	Avoid landing or skidding logs in existing SPZ roads?
040 02h	Roads	Avoid reconstruction of roads in SPZ?
040 03b	Roads	Road debris deposited only outside SPZ and floodplain?
040 03b	Roads	Was road construction debris cleared from drainages?
040 03c	Roads	Was entire SPZ rocked through new class I crossings?
040 03c	Roads	Were erodible materials near streams stabilized?
040 03d	Roads	Has road fill material been properly compacted?
040 03d	Roads	Were ice and stumps kept out of fills?
040 03e	Roads	Has outslope drainage been retained and berms removed?
040 03f	Roads	Are quarries properly drained?
040 03g	Roads	Was fill erosion minimized?
040 03g	Roads	Were drainage structures installed?
040 03h	Roads	Was erosion-causing construction suspended during rain?
040 03i	Roads	Was cut-slope material immediately stabilized/removed?
040 03j	Roads	Are roads on erodible slopes >60% full benched?
040 03j	Roads	Avoid fill slope disposal on erodible slopes >60%?
040 04a	Roads	Is maintenance debris placed to avoid stream entry?
040 04b	Roads	Have erosion sources to streams been repaired?
040 04ci	Roads	Active roads: culverts and ditches functional?
040 04cii	Roads	Active roads: shaped to minimize erosion?
040 04ciii	Roads	Active roads: surface maintained to minimize erosion?
040 04ciii	Roads	Was sediment-causing hauling postponed during rain?
040 04civ	Roads	Were surface-stabilizing chemicals kept out of streams?
040 04cv	Roads	During maintenance in SPZ, were roads stabilized?
040 04cv	Roads	Supplemental filtration at SPZ drainage outlets, if necessary?
040 04d	Roads	Incidental haul roads maintained during active use?
040 04ei	Roads	Are inactive ditches and culverts maintained?
040 04ei	Roads	Are inactive road surfaces controlling erosion?
040 04fi	Roads	Have long-term inactive road surfaces been decommissioned?
040 04fiii	Roads	Are long term inactive bridges and culverts maintained?
040 04g	Roads	Are abandoned drainage structures removed?
040 04g	Roads	Are abandoned road surfaces properly treated?
040 04gi	Roads	Are abandoned crossings restored to original gradient?
040 04gii	Roads	Are abandoned road prisms uncompacted?
040 04giii	Roads	Do abandoned SPZ fills have long-term stability?

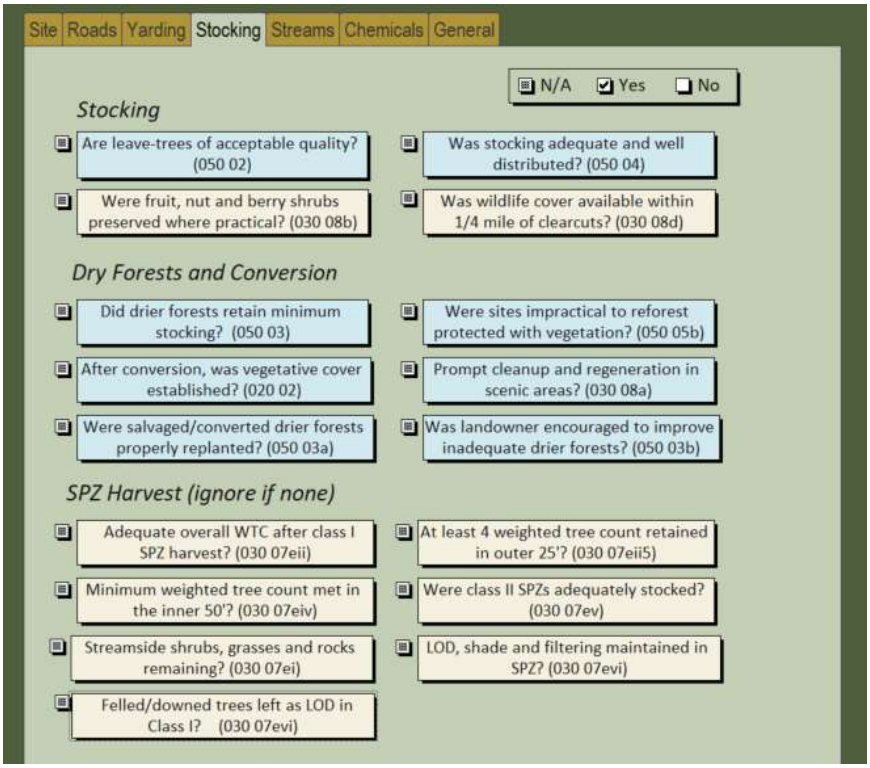
IDAPA 20.02.01 Rule	Rule Group	Description
040 04giv	Roads	Are abandoned sidehill fills stable?
040 04gv	Roads	Has erosion on abandoned ditch-lines been controlled?
040 04gvi	Roads	Has bare soil from road abandonment been stabilized?
050 02	Replanting	Are leave-trees of acceptable quality?
050 03a	Replanting	Did drier forests retain minimum stocking?
050 03a	Replanting	Were salvaged/converted drier forests replanted?
050 03b	Replanting	Was landowner encouraged to restock drier forests?
050 04	Replanting	Was residual stocking or replanting adequate?
050 05b	Replanting	Was replanting-exempt land protected with vegetation?
060 03	Chemicals	Are large petroleum containers stored >100' from water?
060 03	Chemicals	Did pesticide applicator have current Idaho license?
060 03	Chemicals	Does impervious catchment > 110% storage volume?
060 03	Chemicals	If petroleum spilled to water, was IDL notified?
060 03a	Chemicals	Were fuel transfers done away from water and attended?
060 03b	Chemicals	Do tanks avoid petroleum leaks?
060 03c	Chemicals	Was all non-biodegradable waste properly disposed of?
060 04	Chemicals	Was all chemical equipment leak-proof?
060 05a	Chemicals	Was an air-gap used when mixing chemicals with water?
060 05bi	Chemicals	Were chemical landings located to avoid spills to water?
060 05bii	Chemicals	Was equipment washout water properly disposed of?
060 06a	Chemicals	Aerial fertilizer: 50' untreated from water?
060 06a	Chemicals	Aerial pesticide: 100' untreated from water?
060 06c	Chemicals	Was application shut off during turns?
060 07a	Chemicals	Ground pest: 25' untreated from water?
060 07b	Chemicals	Ground fert: 10' untreated from water?
060 08b	Chemicals	Hand: were chemicals kept out of all water sources?
060 09a	Chemicals	Were chemicals applied in accordance with the label?
060 09b	Chemicals	Were chemicals applied at allowable rates?
060 09c	Chemicals	Were chemicals kept out of water?
060 10a	Chemicals	Daily pesticide record - were proper records kept?
060 10b	Chemicals	Daily fertilizer record - were proper records kept?
060 11	Chemicals	Were all pesticide and fertilizer containers removed?
060 12a	Chemicals	Were spills reported to IDL immediately?
060 12b	Chemicals	Were spills controlled and contained immediately?
060 12c	Chemicals	Were spills appropriately removed?
060 13	Chemicals	Were chemical misapplications immediately reported?

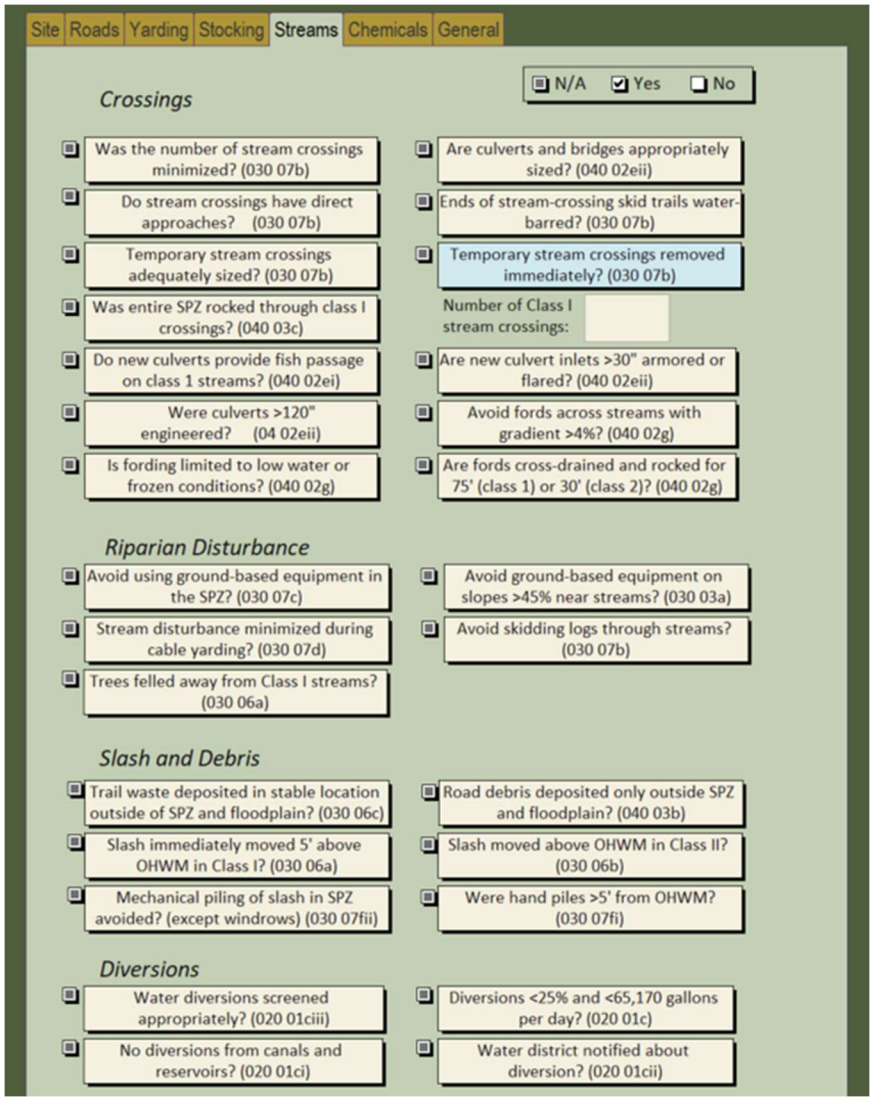
Appendix B. Field Form

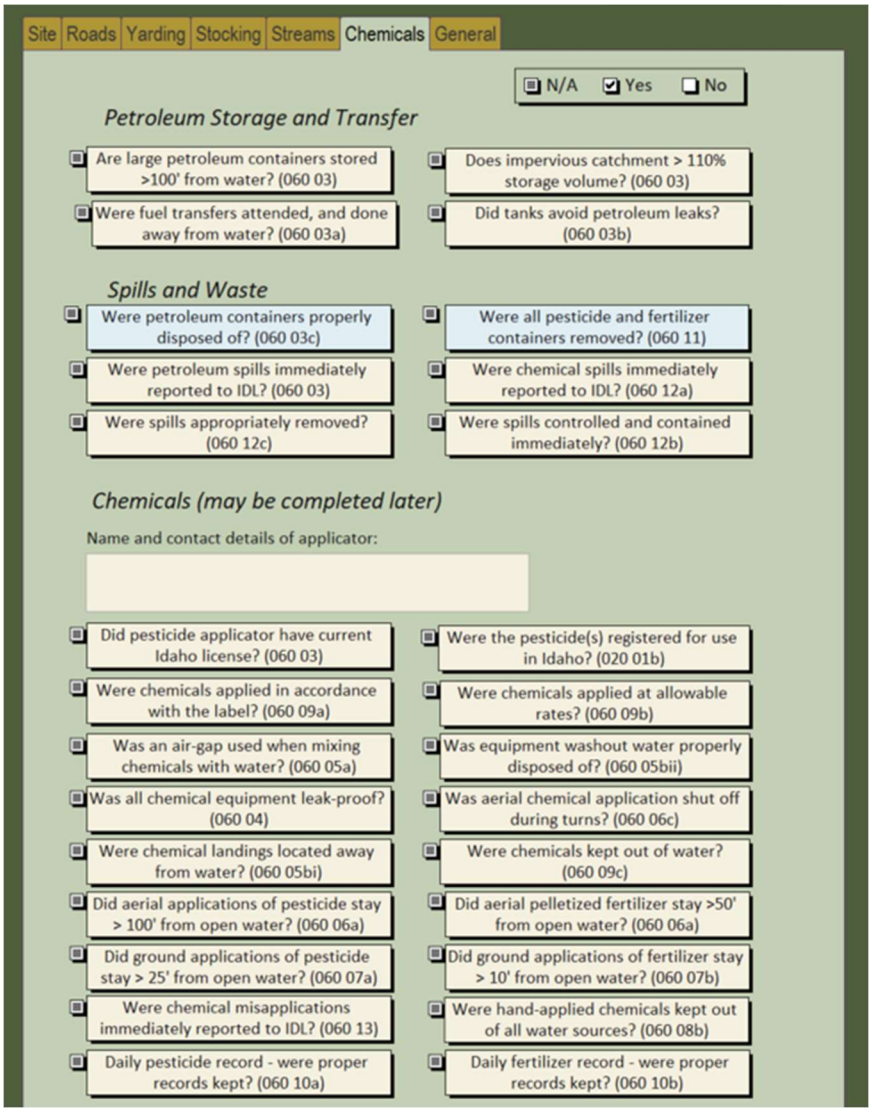


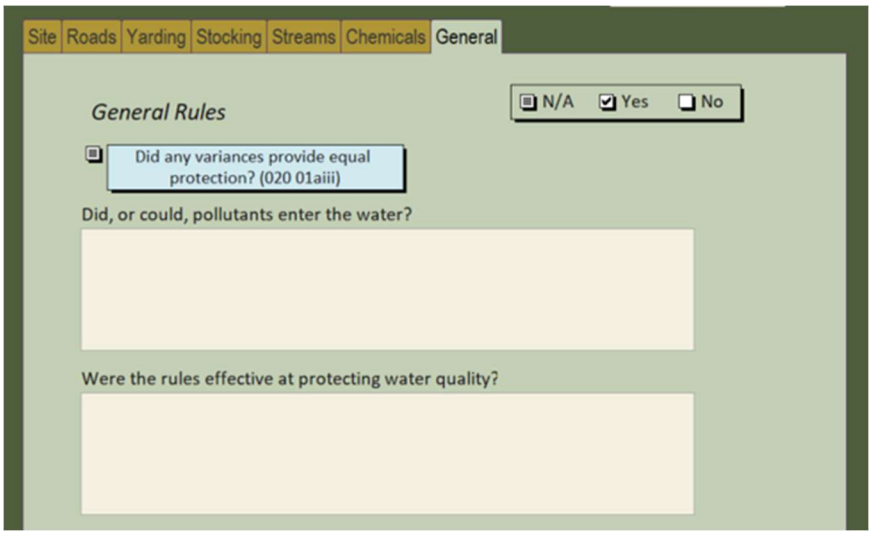

Site
Roads
Yarding
Stocking
Streams
Chemicals
General
N/A
Yes
No
Design
Avoid road construction in SPZ? (040 02a)
Avoid road reconstruction in SPZ? (040 02h)
Road width appropriate? (040 02b)
Retain vegetation between roads and streams? (040 02a)
Road cut and fill volumes minimized? (040 02b)
Natural drainage features installed? (040 02c)
Relief culverts and ditches included where necessary? (040 02d)
Natural drainage prioritized over culverts and ditches? (040 02c)
Construction
Has road fill material been properly compacted? (040 03d)
Has outslope drainage been retained and berms removed? (040 03e)
Were erodible materials near streams stabilized? (040 03c)
Were drainage structures installed to minimize erosion? (040 03g)
Are all relief culverts >12" in diameter? (040 02eiii)
Do drainage culverts avoid discharge of sediment to streams? (040 02d)
Were ice and stumps kept out of fills? (040 03d)
Was embankment erosion minimized? (040 03g)
Was cut-slope material immediately stabilized or removed? (040 03i)
Are drainage culverts properly sized, bedded and compacted? (040 02d)
Are roads on >60% erodible slopes full-benched? (040 03j)
Avoid fill slope disposal on erodible slopes >60%? (040 03j)
Are quarries properly drained? (040 03f)
Was erosion-causing construction suspended during rain?(040 03h)
Was road construction debris cleared from drainage channels? (040 03b)
Maintenance: Active Roads
Active roads: culverts and ditches functional? (040 04ci)
Have erosion sources to streams been repaired? (040 04b)
Active roads: shaped to minimize erosion? (040 04cii)
Active roads: surface maintained to minimize erosion? (040 04ciii)
Were incidental haul roads properly maintained during active use? (04d)
Is maintenance debris placed to avoid stream entry? (040 04a)
During maintenance in SPZ, were road surfaces stabilized? (040 04cv)
During maint. in SPZ, was filtration installed if necessary? (040 04cv)
Were surface-stabilizing materials kept out of streams? (040 04civ)
Note: incidental haul roads are 'active' while in use
Maintenance: Inactive Roads
Are inactive road surfaces controlling erosion? (040 04ei)
Are inactive ditches and culverts maintained? (040 04ei)
Have long-term inactive roads been properly decommisioned? (040 04fi)
Are long-term inactive bridges and culverts maintained? (040 04fiii)
Abandoned Roads
Are abandoned crossings restored to original gradient? (040 04gi)
Are abandoned drainage structures removed? (040 04g)
Are abandoned road surfaces uncompacted? (040 04gii)
Do abandoned SPZ fill slopes have long-term stability? (040 04giii)
Are abandoned sidehill fills stable? (040 04giv)
Has ditch-line erosion been controlled on abandoned roads? (040 04gv)
Have regraded or ripped areas been stabilized? (040 04gvi)
Are abandoned road surfaces properly treated? (040 04g)


Site
Roads
Yarding
Stocking
Streams
Chemicals
General
N/A
Yes
No
Operations
Skid trails kept to minimum width and number (030 03c)
Constructed skid trail gradients <30% on unstable soils? (030 03b))
Are trail drainage and stabilization adequate and current? (030 05a)
Did operations avoid causing deep soil disturbance or erosion? (030 03a)
Were skidding tractor sizes appropriate? (030 03c)
Avoid landing or skidding logs in existing SPZ roads? (040 02h)
Landings and trails in stable areas outside of SPZ? (030 04a)
Was erosion minimized during downhill cable yarding? (030 03d)
Did operations avoid wet areas? (030 08c)
Did tethered logging systems minimize soil disturbance? (010 49)
Landings
Skid and fire trails located to minimize sidecasting? (030 04a)
Sidecasted landings properly stabilized? (030 04c)
Size of landings appropriate? (030 04b)
Landing drainage and stabilization adequate after harvest? (030 05b)
No loose stumps nor excessive slash in landing filler? (030 04c)


Site
Roads
Yarding
Stocking
Streams
Chemicals
General
N/A
Yes
No
Stocking
Are leave-trees of acceptable quality? (050 02)
Was stocking adequate and well distributed? (050 04)
Were fruit, nut and berry shrubs preserved where practical? (030 08b)
Was wildlife cover available within 1/4 mile of clearcuts? (030 08d)
Dry Forests and Conversion
Did drier forests retain minimum stocking? (050 03)
Were sites impractical to reforest protected with vegetation? (050 05b)
After conversion, was vegetative cover established? (020 02)
Prompt cleanup and regeneration in scenic areas? (030 08a)
Were salvaged/converted drier forests properly replanted? (050 03a)
Was landowner encouraged to improve inadequate drier forests? (050 03b)
SPZ Harvest (ignore if none)
Adequate overall WTC after class I SPZ harvest? (030 07eii)
At least 4 weighted tree count retained in outer 25'? (030 07eii5)
Minimum weighted tree count met in the inner 50'? (030 07eiv)
Were class II SPZs adequately stocked? (030 07ev)
Streamside shrubs, grasses and rocks remaining? (030 07ei)
LOD, shade and filtering maintained in SPZ? (030 07evi)
Felled/downed trees left as LOD in Class I? (030 07evi)


Site
Roads
Yarding
Stocking
Streams
Chemicals
General
N/A
Yes
No
Crossings
Was the number of stream crossings minimized? (030 07b)
Are culverts and bridges appropriately sized? (040 02eii)
Do stream crossings have direct approaches? (030 07b)
Ends of stream-crossing skid trails water-barred? (030 07b)
Temporary stream crossings adequately sized? (030 07b)
Temporary stream crossings removed immediately? (030 07b)
Was entire SPZ rocked through class I crossings? (040 03c)
Number of Class I stream crossings:
Do new culverts provide fish passage on class 1 streams? (040 02ei)
Are new culvert inlets >30" armored or flared? (040 02eii)
Were culverts >120" engineered? (04 02eii)
Avoid fords across streams with gradient >4%? (040 02g)
Is fording limited to low water or frozen conditions? (040 02g)
Are fords cross-drained and rocked for 75' (class 1) or 30' (class 2)? (040 02g)
Riparian Disturbance
Avoid using ground-based equipment in the SPZ? (030 07c)
Avoid ground-based equipment on slopes >45% near streams? (030 03a)
Stream disturbance minimized during cable yarding? (030 07d)
Avoid skidding logs through streams? (030 07b)
Trees felled away from Class I streams? (030 06a)
Slash and Debris
Trail waste deposited in stable location outside of SPZ and floodplain? (030 06c)
Road debris deposited only outside SPZ and floodplain? (040 03b)
Slash immediately moved 5' above OHWM in Class I? (030 06a)
Slash moved above OHWM in Class II? (030 06b)
Mechanical piling of slash in SPZ avoided? (except windrows) (030 07fii)
Were hand piles >5' from OHWM? (030 07fi)
Diversions
Water diversions screened appropriately? (020 01ciii)
Diversions <25% and <65,170 gallons per day? (020 01c)
No diversions from canals and reservoirs? (020 01ci)
Water district notified about diversion? (020 01cii)


Site
Roads
Yarding
Stocking
Streams
Chemicals
General
N/A
Yes
No
Petroleum Storage and Transfer
Are large petroleum containers stored >100' from water? (060 03)
Does impervious catchment > 110% storage volume? (060 03)
Were fuel transfers attended, and done away from water? (060 03a)
Did tanks avoid petroleum leaks? (060 03b)
Spills and Waste
Were petroleum containers properly disposed of? (060 03c)
Were all pesticide and fertilizer containers removed? (060 11)
Were petroleum spills immediately reported to IDL? (060 03)
Were chemical spills immediately reported to IDL? (060 12a)
Were spills appropriately removed? (060 12c)
Were spills controlled and contained immediately? (060 12b)
Chemicals (may be completed later)
Name and contact details of applicator:
Did pesticide applicator have current Idaho license? (060 03)
Were the pesticide(s) registered for use in Idaho? (020 01b)
Were chemicals applied in accordance with the label? (060 09a)
Were chemicals applied at allowable rates? (060 09b)
Was an air-gap used when mixing chemicals with water? (060 05a)
Was equipment washout water properly disposed of? (060 05bii)
Was all chemical equipment leak-proof? (060 04)
Was aerial chemical application shut off during turns? (060 06c)
Were chemical landings located away from water? (060 05bi)
Were chemicals kept out of water? (060 09c)
Did aerial applications of pesticide stay > 100' from open water? (060 06a)
Did aerial pelletized fertilizer stay >50' from open water? (060 06a)
Did ground applications of pesticide stay > 25' from open water? (060 07a)
Did ground applications of fertilizer stay > 10' from open water? (060 07b)
Were chemical misapplications immediately reported to IDL? (060 13)
Were hand-applied chemicals kept out of all water sources? (060 08b)
Daily pesticide record - were proper records kept? (060 10a)
Daily fertilizer record - were proper records kept? (060 10b)


Site
Roads
Yarding
Stocking
Streams
Chemicals
General
N/A
Yes
No
General Rules
Did any variances provide equal protection? (020 01aiii)
Did, or could, pollutants enter the water?
Were the rules effective at protecting water quality?

Appendix C. Photo Album

Figure C1. The Audit Team.

Figure C2. Intensively managed landscape.

Short Culvert Pipes

Figure C3. Vertical headwalls.

Figure C4. Perched culvert pipe and bare unstable dirt.

Figure C5. Short culvert pipe, vertical headwalls.

Figure C6. Erosion of the fill.

Slash Piles in SPZ

Figure C7. Slash pile burned and eroded next to creek.

Figure C8. Blown out culvert (blocked by slash).

Figure C9. Slash in the creek.

Most operations complied with most rules

Figure C10. No decking in the SPZ.

Figure C11. Stream crossing protected by slash.

Figure C12. Nicely protected abandoned road.

Figure C13. Measuring a water screen.

Maintenance Debris

Figure C14. Bare dirt alongside stream.

Figure C15. Dirt graded off edge of bridge.

Figure C16. Dirt sidecast into the SPZ.

Figure C17. Culvert cleaning debris in stream.

Shade Recovery Pilot Study

Figure C18. Shade site 7 years post-harvest.

Figure C19. Measuring shade using a Solar Pathfinder.