

**STUDY 240: PROTOCOL FOR MONITORING GROUND WATER IN SECTIONS  
WITH REPORTED DETECTIONS OUTSIDE EXISTING GROUND WATER  
PROTECTION AREAS**

**Attachment 1: Appendices A-D**

## Appendix A: Butte County

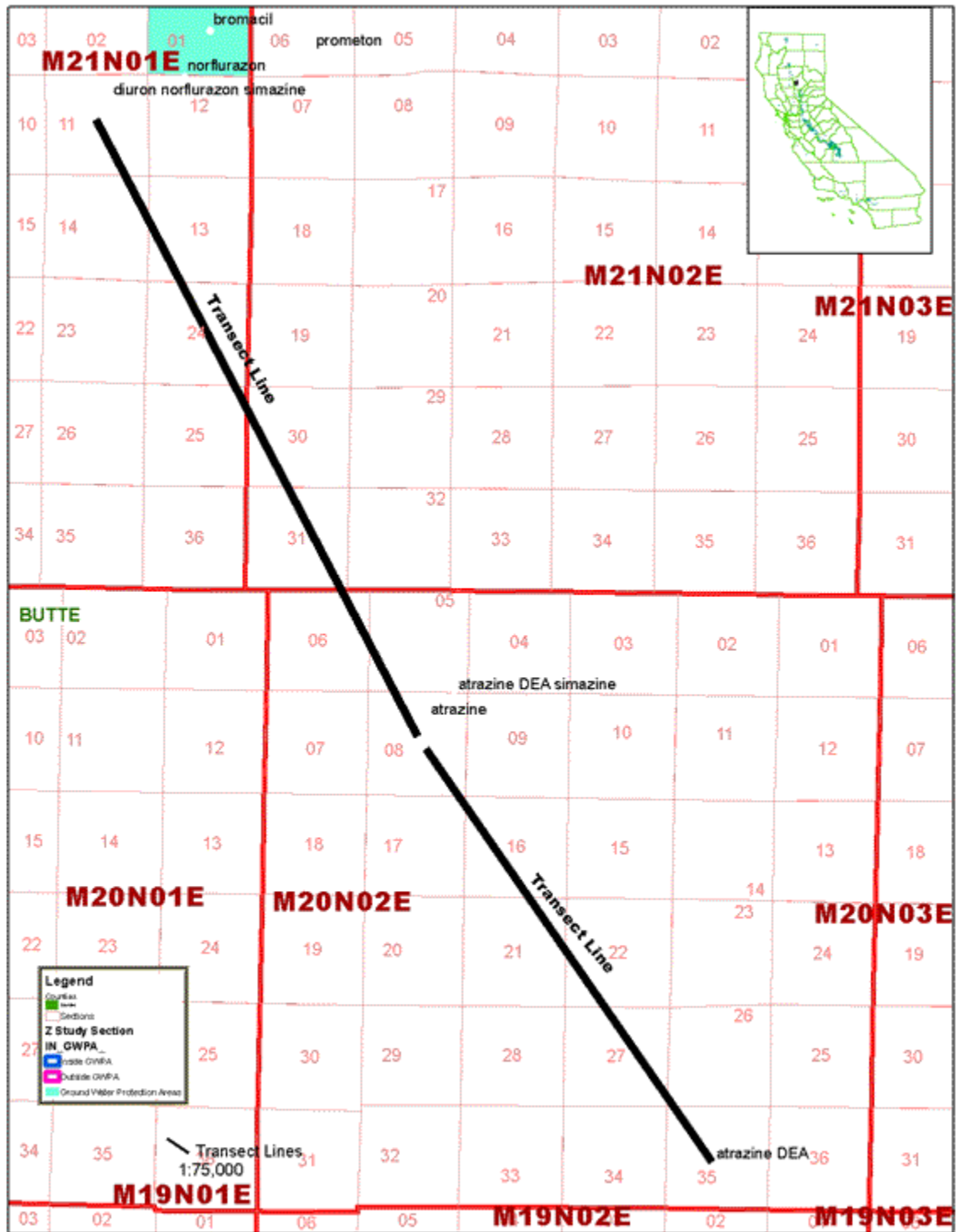
**Study Area:** This study will focus on **Butte** County and will consist of two connected transects southwest of Chico extending from section 21N/01E-11 southeastward through section 20N/02E-35. Two wells will be sampled in each section of the transects except as noted in Table A-1. Figure A-1 shows the first transect line just southwest of Chico in Butte County. This line extends to 20N/02E-08. DPR has previously sampled 7 wells in the transect sections, the latest in 1998. Section 21N/01E-11 is adjacent to a GWPA and contains two DPR sampled wells. One well contained residues of diuron, norflurazon and simazine and the other had no residues reported. Both wells were sampled in 2000. The section is in the process of being added to the GWPA list. Section 20N/02E-08 has a verified detection of simazine in one well and unverified detections of very low levels (0.001-0.003 ppb) of atrazine, DEA and simazine. DPR study Z390 was conducted in this area in based on the original 1995 simazine detection. None of the three additional wells were sampled had reported residues.

The second transect extends from section 20N/02E-08 through section. Two additional wells were sampled in this transect, the latest in 1992. There is an unverified detection of atrazine and DEA in section 20N/02E-35 at very low levels (0.003 ppb).

Table A-1. Butte Transects 01 and 02 sections. See figure A-1

Township, Range, Section	Last Year Sampled for Triazines	Previously Detected Pesticides	Planned Wells to Sample	Sampling Notes
21N/01E-11	2000	Diuron, norflurazon, simazine	0	This section is already identified as a new GWPA
21N/01E-14			1	
21N/01E-13			2	
21N/01E-24			2	
21N/01E-25	1990		1	
21N/02E-30			2	
21N/02E-31			2	
20N/02E-06			2	
20N/02E-05	1996		2	
20N/02E-08	1996	Atrazine	2	Atrazine, simazine and DEA were detected by another agency in a different well at very low levels (0.001-0.003 ppb)
20N/02E-17	1992		1	
20N/02E-16			2	
20N/02E-21			2	
20N/02E-22			2	
20N/02E-27			2	
20N/02E-26			1	
20N/02E-35	1989		2	Atrazine and DEA were detected by another agency at very low levels (0.003 ppb)
<b>Total Wells</b>			<b>28</b>	

Figure A-1. Study 240 Butte County ground water transects 01 and 02.



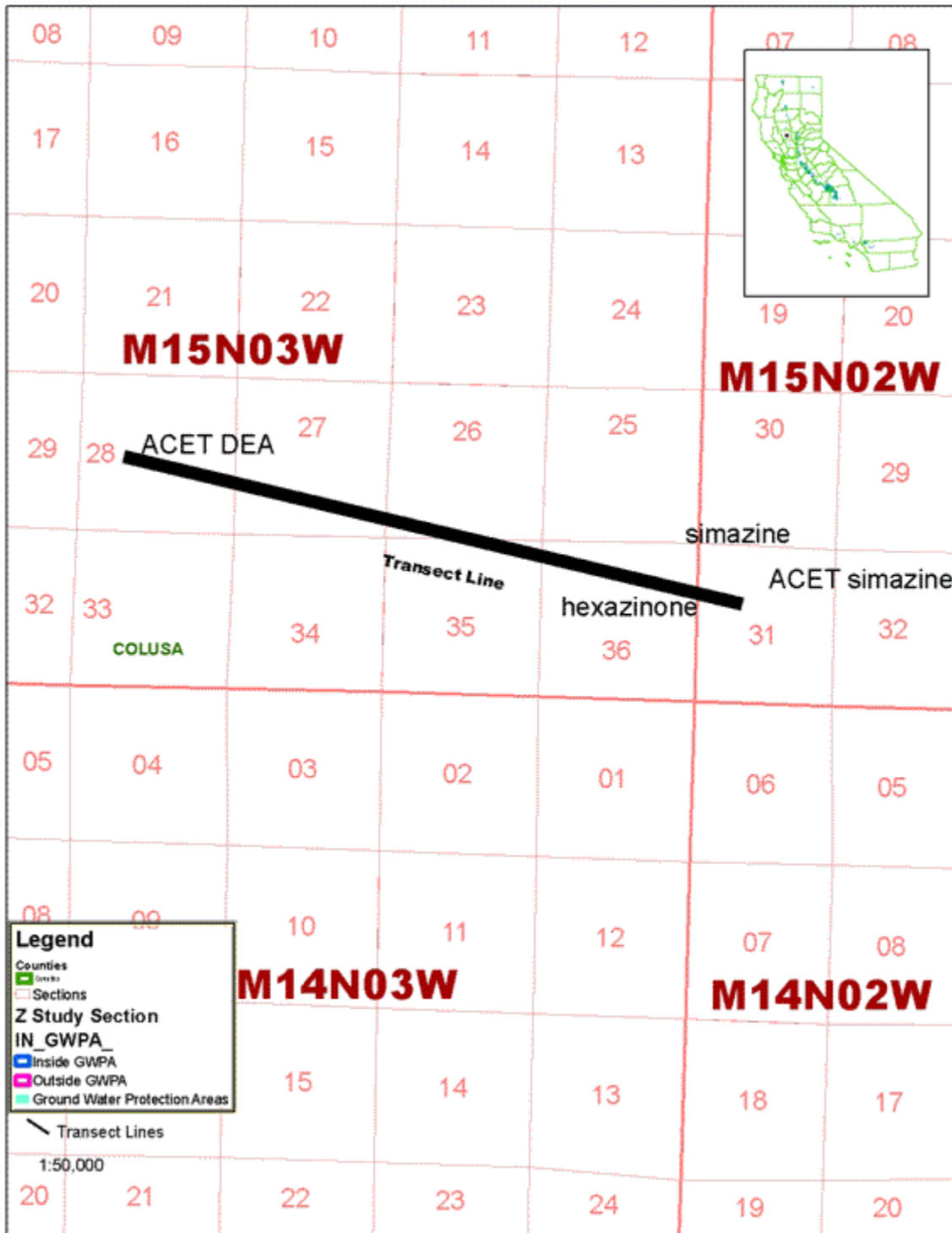
## Appendix B: Colusa County

**Study Area:** The study will focus on Colusa County and will consist of a single transect extending from section 15N/03W-28 southeastward through section 15N/02W-31. Two additional wells will be sampled in each section in the transect except as noted in Table B-1. Figure B-1 shows the transect line south of Williams in Colusa County. DPR has previously sampled 10 wells in the transect sections, the latest in 1999. The closest GWPA is located nine miles to the southeast of the proposed transect. Up to 11 wells may be sampled for this transect.

Table B-1. Colusa 01 Transect sections. See figure B-1

Township, Range, Section	Last Year Sampled for Triazines	Previously Detected Pesticides	Planned Wells to Sample	Sampling Notes
15N/03W-28	1999	ACET, DEA	2	Z417 conducted in 1999. 3 additional wells sampled, no pesticides were detected in those wells
15N/03W-27	1993		2	
15N/03W-26	1998		2	1 well sampled for Z414, no pesticides detected. Breakdown products were not included in the study screen at that time.
15N/03W-35			1	
15N/03W-36	1998	Hexazinone, simazine	2	Z414 conducted in 1998 for hexazinone. Breakdown products were not included in the study screen at that time.
15N/02W-31	1999	Simazine, ACET	2	
<b>Total Wells</b>			<b>11</b>	

Figure B-1. Study 240 Colusa County ground water transect 01.



## Appendix C: Fresno County

**Study Area:** This study will focus on **Fresno** County and will consist of ten transects in central and northwestern portions of the county as shown in figure C-1. Table C-1 provides a summary of the planned numbers of wells and the four-section surveys included in the transect areas. Tables C-2 – C-11 present the detailed section list and wells to be sampled for each of the ten transects. Figures C-2 – C-6 show more detailed views of these transects. Up to 93 wells will be sampled for the planned transects in Fresno County. The numbers of potential wells listed for the individual transects are based on the assumption that the transects are done in order and the wells in overlapping sections are counted in the lowest numbered transect to avoid double counting.

Table C-1. Summary of Transect Lines in Fresno County. See figure C-1

Fresno Transect Number	Ref. Table/ Figure	Township, Range, Section		Potential Number Of Sections	Planned Number Of Wells	Four-Section Surveys and Transect Notes
		Starting	Ending			
01	C-2/ C-2	11S/13E-09	11S/12E-24	6	10	Z277 Diuron verified. Unverified prometon and simazine detections.
02	C-3/ C-3	13S/18E-12	13S/19E-27	6	11	Z405 ACET verified. Z312 ACET, simazine verified. 2 GWPA sections in transect area.
03	C-4/ C-3	14S/18E-02	14S/19E-19	6	11	Z320 Diuron, simazine verified. Z321 diuron verified. Z170 simazine verified. Overlaps Fresno 04.
04	C-5/ C-3	14S/18E-11	14S/18E-30	8	10	Z170 Simazine verified. Z476 ACET, DACT verified. Transect overlaps Fresno 03.
05	C-6/ C-4	16S/17E-14	16S/18E-21	6	10	Z449 Diuron verified. Z344 bromacil, diuron verified. Overlaps Fresno 06.
06	C-7/ C-4	16S/18E-21	16S/19E-20	6	10	Z344 Bromacil, diuron verified. Simazine verified in 16S/19E-20. Overlaps Fresno 05 and Fresno 08.
07	C-8/ C-5	15S/19E-25	16S/19E-02	4	8	Z482 Simazine verified. Z345 ACET, simazine verified. Overlaps Fresno 08.
08	C-9/ C-5	16S/19E-02	16S/19E-20	7	7	Z345 ACET, simazine verified. Overlaps Fresno 06, Fresno 07 and Fresno 09.
09	C-10/ C-6	16S/19E-20	17S/19E-22	9	13	Z362 Diuron verified. Overlaps Fresno 06, 08 and 10.
10	C-11/ C-6	17S/19E-22	17S/19E-36	3	3	Z362 Diuron verified. Overlaps Fresno 09 and Kings 01. 2 GWPA sections in transect.
<b>Total Wells</b>					<b>93</b>	

Figure C-1. Study 240 overview of transect areas in Fresno County. Detail figures for each transect are indicated by the large blue boxes.

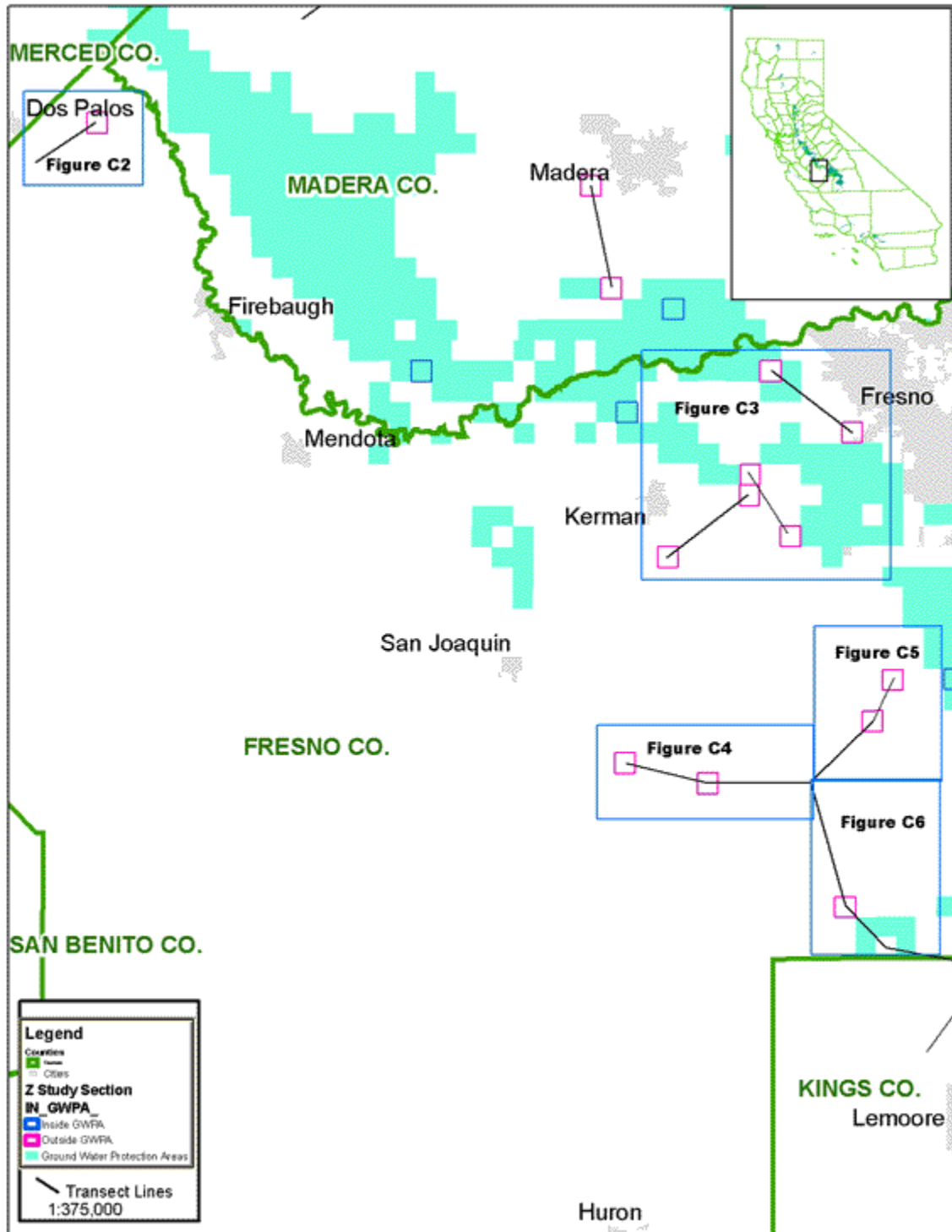


Table C-2 and Figure C-2 detail the Fresno 01 transect line southeast of Dos Palos. This line extends from 11S/13E-09 to 11S/12E-24. DPR has previously sampled nine wells in the transect sections, the latest in 1994. Section 11S/13E-09 is the primary section for four-section survey Z277 (diuron) awaiting completion. Prometon and simazine residues were reported in 1992 but could not be verified. Simazine residues were reported in a well in section 11S/12E-24 but these could not be verified in a 1993 study. Up to 10 wells may be sampled.

Table C-2. Fresno 01 Transect sections. See figure C-2.

Township, Range, Section	Last Year Sampled for Triazines	Previously Detected Pesticides	Planned Wells to Sample	Sampling Notes
11S/13E-09	1994	Diuron	2	Z277 Diuron verified. Unverified prometon and simazine detections.
11S/13E-08	1994		1	4 wells previously sampled, no residues detected.
11S/13E-17			2	
11S/13E-18			2	
11S/13E-19	1993		1	2 wells sampled in 1993, no residues detected.
11S/12E-24	1993	Simazine	2	1 well sampled in 1993. Unverified simazine detection reported by another agency
<b>Total Wells</b>			<b>10</b>	



Figure C-2. Study 240 Fresno County transect 01

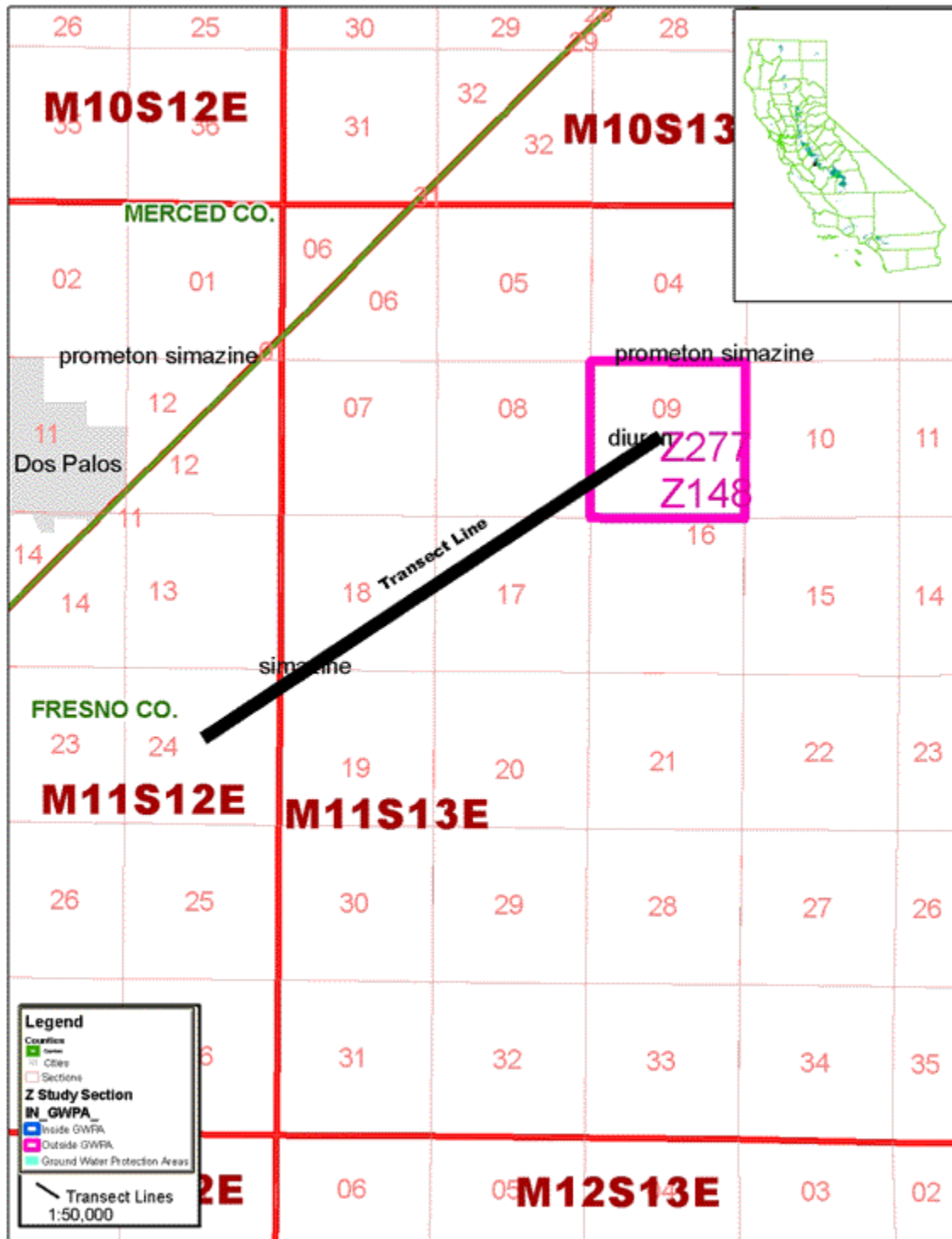


Table C-3 and Figure C-3 detail the Fresno 02 transect line just west of Fresno. This line extends from 13S/18E-12 to 13S/19E-27. DPR has previously sampled two wells in the transect sections, the latest in 1996. Two of the sections, 13S/19E-07 and 13S/19E-18, are existing GWPAs so no wells will be sampled there. Section 13S/18E-12 is nearly surrounded by GWPAs and is the primary section for four-section survey Z405 (ACET). Section 13S/19E-27 is adjacent to GWPAs to the south and is the primary section for four-section survey Z312 (simazine and ACET). Up to 11 wells may be sampled.

Table C-3. Fresno 02 Transect sections. See figure C-3

Township, Range, Section	Last Year Sampled for Triazines	Previously Detected Pesticides	Planned Wells to Sample	Sampling Notes
13S/18E-12	1996	ACET	2	Z405 ACET verified. Section surrounded by GWPA.
13S/19E-07			0	Section is a GWPA
13S/19E-18			0	Section is a GWPA
13S/19E-17			2	
13S/19E-20			2	
13S/19E-21			2	
13S/19E-28			1	
13S/19E-27	1994		2	Z312 ACET, simazine verified.
<b>Total Wells</b>			<b>11</b>	

Table C-4 and Figure C-3 detail the Fresno 03 transect line southwest of Fresno. This line extends from 14S/18E-02 to 14S/19E-19. DPR has previously sampled six wells in the transect sections, the latest in 1994. Section 14S/18E-02 is adjacent to two GWPAs and is the primary section for four-section survey Z320 (diuron and simazine). Section 14S/18E-11 is the primary section for four-section survey Z170 (simazine). Additionally, this section overlaps the Fresno 04 transect. Section 14S/19E-19 is adjacent to GWPAs to the east and is the primary section for four-section survey Z332 (diuron). Up to 11 wells may be sampled.

Table C-4. Fresno 03 Transect sections. See figure C-3

Township, Range, Section	Last Year Sampled for Triazines	Previously Detected Pesticides	Planned Wells to Sample	Sampling Notes
14S/18E-02	1994	Diuron, simazine	2	Z320 Diuron, simazine verified. GWPA to west and northeast.
14S/18E-11	1992		2	Z170 Simazine verified. 1 well sampled by DPR in 1990 had no residues. Section overlaps Fresno 04.
14S/18E-12			2	
14S/18E-13	1987		2	
14S/19E-18	1988		1	
14S/19E-19	1994	Diuron	2	Z321 Diuron verified. Could find a well in sections 29 or 30 also
<b>Total Wells</b>			<b>11</b>	

Table C-5 and Figure C-3 detail the Fresno 04 transect line southeast of Kerman. This line extends from 14S/18E-11 to 14S/18E-30. DPR has previously sampled seven wells in the transect sections, the latest in 2002. Section 14S/18E-01 is adjacent to one GWPA and is the primary section for four-section survey Z170 (simazine). If two wells are sampled here for transect Fresno 03, no further wells need be sampled. Section 14S/18E-30 is the primary section for four-section survey Z476 (diuron). Up to 10 wells may be sampled.

Table C-5. Fresno 04 Transect sections. See figure C-3

Township, Range, Section	Last Year Sampled for Triazines	Previously Detected Pesticides	Planned Wells to Sample	Sampling Notes
14S/18E-11	1992		0	Z170 Simazine verified. 1 well sampled by DPR in 1990 had no residues. Section overlaps Fresno 03
14S/18E-10			1	
14S/18E-15	2002		1	Do not resample well sampled for GW02.
14S/18E-16			2	
14S/18E-21			2	
14S/18E-20			2	
14S/18E-29	1988	Diuron	1	Z321 Diuron verified. Could find a well in section 30 also
14S/18E-30	2002	ACET, DACT	1	Z476 ACET, DACT verified. Do not resample the 2002 well.
<b>Total Wells</b>			<b>10</b>	

Figure C3. Study 240 Fresno County transects 02, 03 and 04.

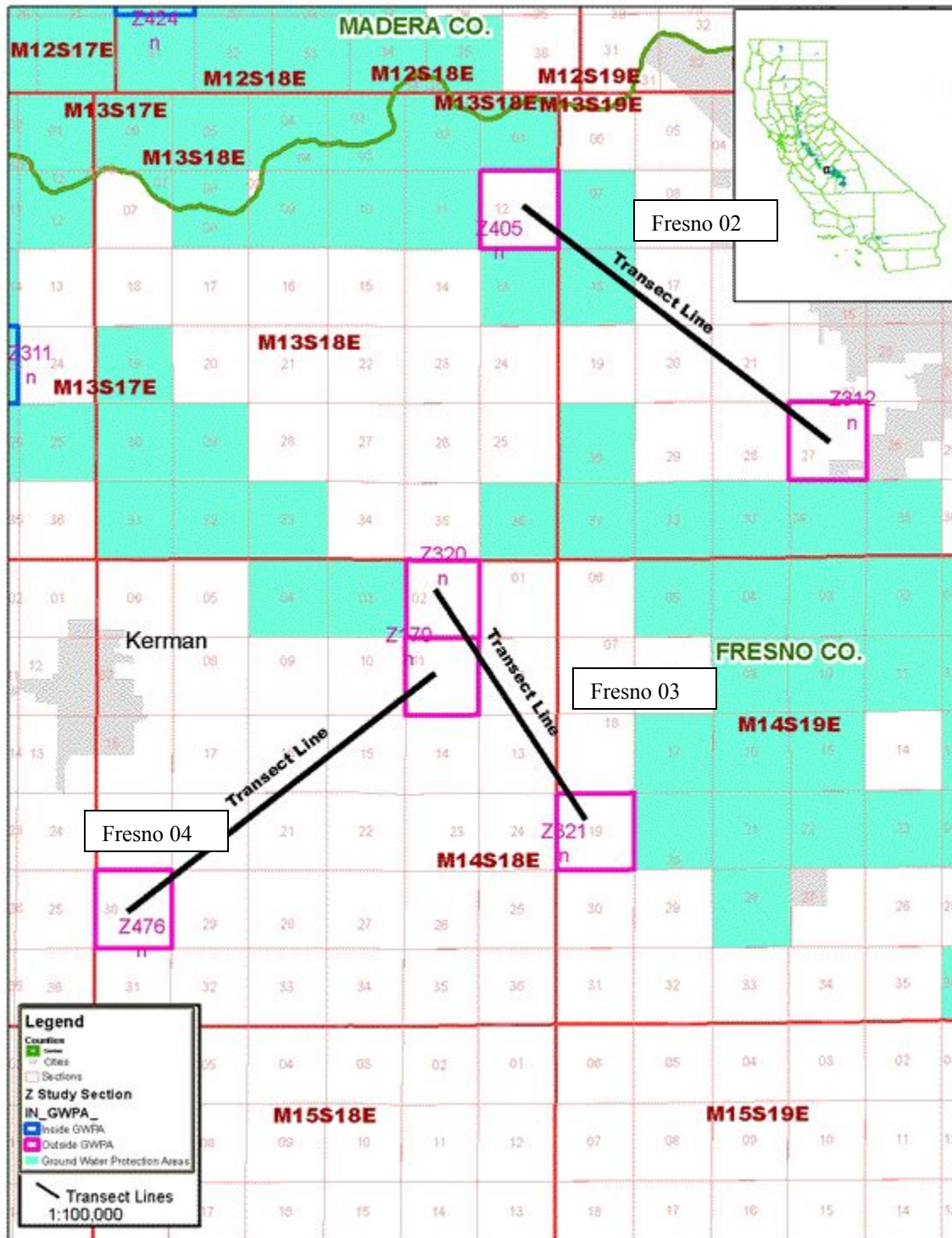


Table C-6 and Figure C-4 detail the Fresno 05 transect line southeast of San Joaquin. This line extends from 16S/17E-14 to 16S/18E-21. DPR has previously sampled three wells in the transect

sections, the latest in 2001. Section 16S/17E-14 is the primary section for four-section survey Z449 (diuron). Section 16S/18E-21 is the primary section for four-section survey Z344 (bromacil and diuron). Up to 10 wells may be sampled.

Table C-6. Fresno 05 Transect sections. See figure C-4

Township, Range, Section	Last Year Sampled for Triazines	Previously Detected Pesticides	Planned Wells to Sample	Sampling Notes
16S/17E-14	2001	Diuron	2	Z449 Diuron verified.
16S/17E-13			2	
16S/18E-18			1	
16S/18E-19			1	
16S/18E-20			2	
16S/18E-21	1995	Bromacil, Diuron	2	Z344 Bromacil, diuron verified. Section overlaps Fresno 06.
<b>Total Wells</b>			<b>10</b>	

Table C-7 and Figure C-4 detail the Fresno 06 transect line. This line extends from 16S/18E-21 to 16S/19E-20. DPR has previously sampled five wells in the transect sections, the latest in 1995. Section 16S/18E-21 is the primary section for four-section survey Z344 (bromacil and diuron). If two wells are sampled here for transect Fresno 05, no further wells need be sampled. Section 16S/19E-20 has a previously verified detection of simazine. This section will overlap Fresno transects 08 and 09. Up to 10 wells may be sampled.

Table C-7. Fresno 06 Transect sections. See figure C-4

Township, Range, Section	Last Year Sampled for Triazines	Previously Detected Pesticides	Planned Wells to Sample	Sampling Notes
16S/18E-21	1995	Bromacil, Diuron	0	Z344 Bromacil, diuron verified. Section overlaps Fresno 05.
16S/18E-22			2	
16S/18E-23			2	
16S/18E-24			2	
16S/19E-19			2	
16S/19E-20	1991	Simazine	2	Z086 Simazine verified. Section overlaps Fresno 06, 08, 09.
<b>Total Wells</b>			<b>10</b>	

Figure C-4. Study 240 Fresno County transects 05 and 06.

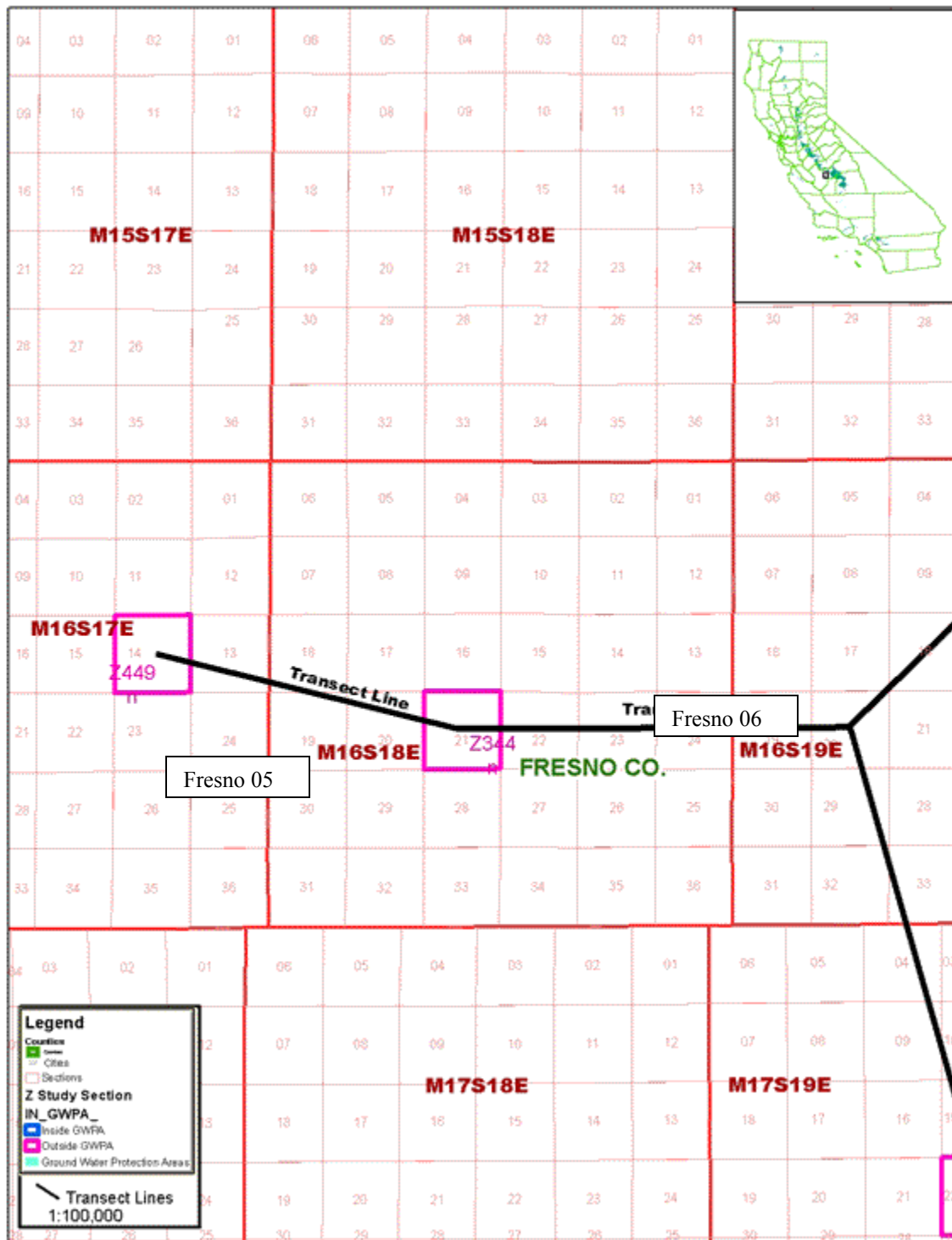


Table C-8 and Figure C-5 detail the Fresno 07 transect line. This line extends from 15S/19E-25 to 16S/19E-02. DPR has previously sampled three wells in the transect sections, the latest in 2002. Section 15S/19E-25 is the primary section for four-section survey Z482 (simazine). Sample only one well in this section and do not resample the well sampled in 2002. Section 16S/19E-02 is the primary section for four-section survey Z345 (ACET). This section will overlap Fresno transect 08. Up to six wells may be sampled.

Table C8. Fresno 07 Transect sections. See figure C-5

Township, Range, Section	Last Year Sampled for Triazines	Previously Detected Pesticides	Planned Wells to Sample	Sampling Notes
15S/19E-25	2002	Simazine	1	Z482 Simazine verified. Do not resample the original well.
15S/19E-36			2	
15S/19E-35			1	
16S/19E-02	1995		2	Z345 ACET, simazine verified. Section overlaps transect Fresno 08
<b>Total Wells</b>			<b>6</b>	

Table C-9 and Figure C-5 detail the Fresno 08 transect line. This line extends from 16S/19E-02 to 16S/19E-20. DPR has previously sampled ten wells in the transect sections, the latest in 2002. Section 16S/19E-02 is the primary section for four-section survey Z345 (ACET). If two wells are sampled here for transect Fresno 07, no further wells will be sampled. Section 16S/19E-11 contains a well sampled by DPR in 2002, so only one other well is required. Section 16S/19E-20 has a previously verified detection of simazine. This section will overlap Fresno transects 06 and 09. If two wells have been previously sampled here for transects Fresno 06 or 09, no further wells are required. Up to seven wells may be sampled.

Table C-9. Fresno 08 Transect sections. See figure C-5

Township, Range, Section	Last Year Sampled for Triazines	Previously Detected Pesticides	Planned Wells to Sample	Sampling Notes
16S/19E-02	1995		0	Z345 ACET, simazine verified. Section overlaps transect Fresno 07
16S/19E-11	2002		1	Do not resample GW02 well
16S/19E-10			2	
16S/19E-15			1	
16S/19E-16			2	
16S/19E-17	1991		1	
16S/19E-20	1991	Simazine	0	Z086 Simazine verified. Section overlaps Fresno 06, 08, 09.
<b>Total Wells</b>			<b>7</b>	

Figure C-5. Study 240 Fresno County transects 07 and 08.

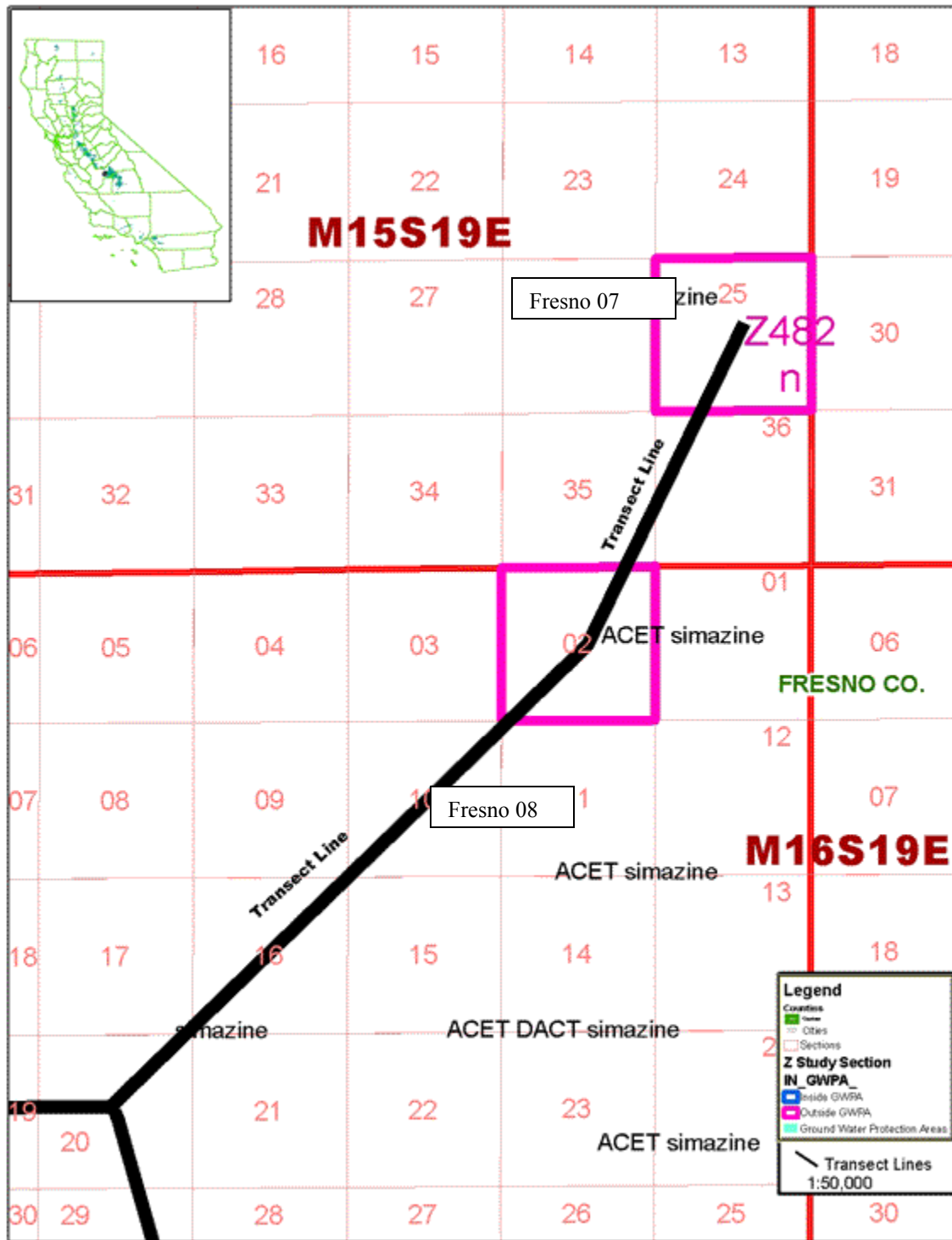




Table C-10 and Figure C-6 detail the Fresno 09 transect line. This line extends from 16S/19E-20 to 17S/19E-22. DPR has previously sampled five wells in the transect sections, the latest in 1995. Section 16S/19E-20 has a previously verified detection of simazine. This section overlaps Fresno transects 06 and 08. If two wells are sampled here for transect Fresno 06 or 08, no further wells will be sampled. Section 17S/19E-22 is the primary section for four-section survey Z362 (diuron.). This section overlaps Fresno transect 10. Up to 13 wells may be sampled.

Table C-10. Fresno 09 Transect sections. See figure C-6

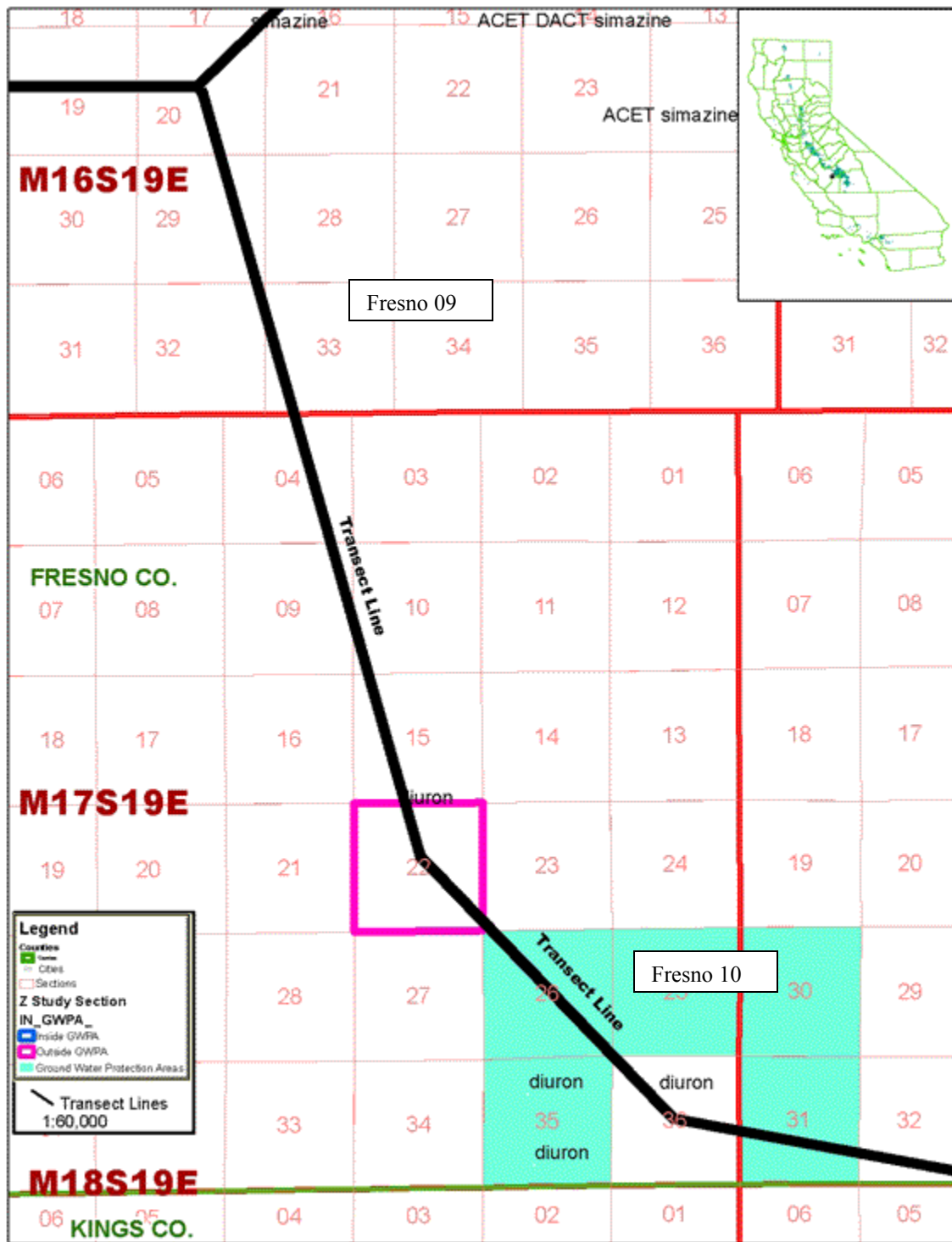
Township, Range, Section	Last Year Sampled for Triazines	Previously Detected Pesticides	Planned Wells to Sample	Sampling Notes
16S/19E-20	1991	Simazine	0	Z086 Simazine verified. Section overlaps Fresno 06, 08, 09.
16S/19E-29			2	
16S/19E-32			1	
16S/19E-33			1	
17S/19E-04			2	
17S/19E-09			2	
17S/19E-10			1	
17S/19E-15			2	
17S/19E-22	1995	Simazine	2	Z362 Diuron verified. Section overlaps Fresno 10.
<b>Total Wells</b>			<b>13</b>	

Table C-11 and Figure C-6 detail the Fresno 10 transect line. This line extends from 17S/19E-22 to 17S/19E-36. DPR has previously sampled four wells in the transect sections, the latest in 2001. Section 17S/19E-22 is the primary section for four-section survey Z362 (diuron). This section overlaps Fresno transects 09. If two wells are sampled here for transect Fresno 09, no further wells will be sampled. Two of the intervening sections, 17S/19E-25 and 17S/19E-26, are already GWPAs so no wells will be sampled there. Section 17S/19E-36 could become a GWPA based on the diuron detection in the section and other diuron detections in an adjacent section. This transect is a low priority. Up to 3 wells may be sampled.

Table C-11. Fresno 10 Transect sections. See figure C-6

Township, Range, Section	Last Year Sampled for Triazines	Previously Detected Pesticides	Planned Wells to Sample	Sampling Notes
17S/19E-22	1995	Simazine	0	Z362 diuron verified. Section overlaps Fresno 09.
17S/19E-23			1	
17S/19E-26			0	GWPA
17S/19E-25			0	GWPA
17S/19E-36	2001	Diuron	2	
<b>Total Wells</b>			<b>3</b>	

Figure C6. Study 240 Fresno County transects 09 and 10.



## Appendix D: Glenn County

**Study Area:** This study will focus on **Glenn** County and will consist of two transects in eastern portions of the county as shown in figure D-1. Table D-1 provides a summary of the planned numbers of wells and the four-section surveys included in the transect areas. Tables E-2 – E-3 present the detailed section list and wells to be sampled for both of the transects. Figures E-2 –E-3 show more detailed views of these transects. Up to 23 wells will be sampled for the planned transects in Glenn County.

Table D-1. Summary of Transect Lines in Kern County. See figure D-1

Kern Transect Number	Ref. Table/ Figure	Township, Range, Section		Potential Number Of Sections	Planned Number Of Wells	Four-Section Surveys and Transect Notes
		Starting	Ending			
01	D-2/ D-2	22N/02W-31	21N/02W-23	9	13	Z538 and Z539. Atrazine and DEA verified.
10	D-3/ D-3	19N/02W-23	18N/02W-12	6	10	Z536 Diuron and simazine unverified. Detections at very low levels by USGS.
<b>Total Wells</b>					<b>23</b>	

Figure D-1. Study 240 overview of transect areas in Glenn County. Detail figures for each transect are indicated by the large blue boxes.

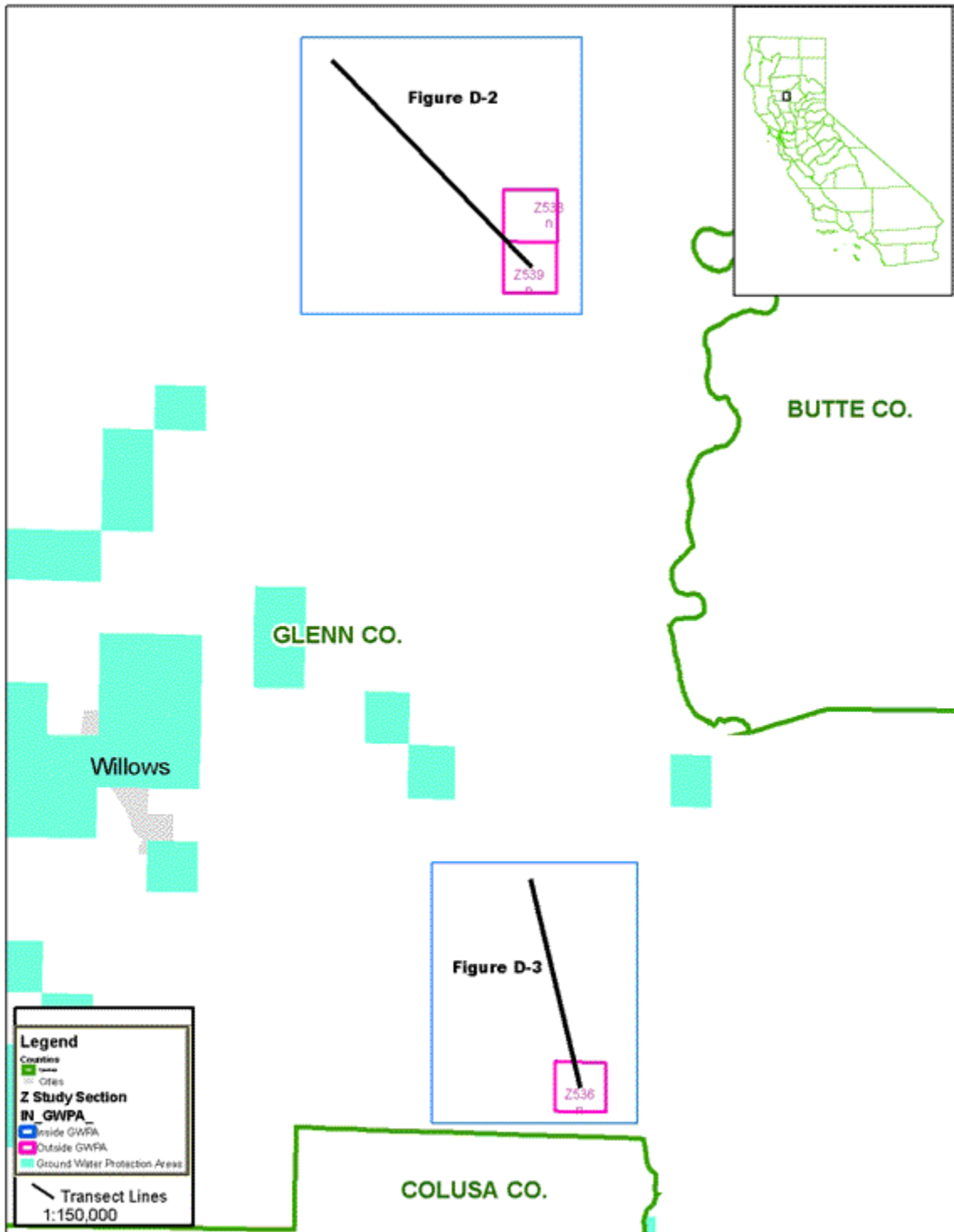


Table D-2 and Figure D-2 detail the Glenn 01 transect southeast of Orland extending from section 22N/02W-31 through section 21N/02W-23. Two additional wells will be sampled in each section in the transect except as noted in Table D-2. DPR has previously sampled 10 wells in the transect sections, the latest in 2003. Section 22N/02W-31 contains one well with and unverified detection of atrazine. Section 21N/02W-09 contains one well with and verified detection of simazine. Section 21N/02W-14 is the primary section for four-section survey Z538 (atrazine and DEA). Section 21N/02W-23 is the primary section for four-section survey Z539 (atrazine and DEA). Do not resample the GW03 sampled wells. The closest GWPA is located three miles to the northeast of the proposed transect.

Table D-2. Glenn 01 transect sections. See also Figure D-2.

Township, Range, Section	Last Year Sampled for Triazines	Previously Detected Pesticides	Planned Wells to Sample	Sampling Notes
22N/02W-31	1993	Atrazine	2	Reported atrazine detection could not be verified by Z229 conducted in 1993. 4 wells were sampled, no pesticides were detected in those wells
21N/02W-06			1	
21N/02W-05			2	
21N/02W-08			1	
21N/02W-09	1994	Simazine	2	Simazine was verified in one well. Z237 conducted in 1994 based on this detection. No pesticides were detected in any of the three wells sampled.
21N/02W-16			1	
21N/02W-15			2	
21N/02W-14	2003	Atrazine, DEA	1	Atrazine and DEA verified. Do not resample original well.
21N/02W-23	2003	Atrazine, DEA	1	Atrazine and DEA verified. Do not resample original well.
<b>Total Wells</b>			<b>13</b>	

Figure D-2. Study 240 Glenn County transect 01

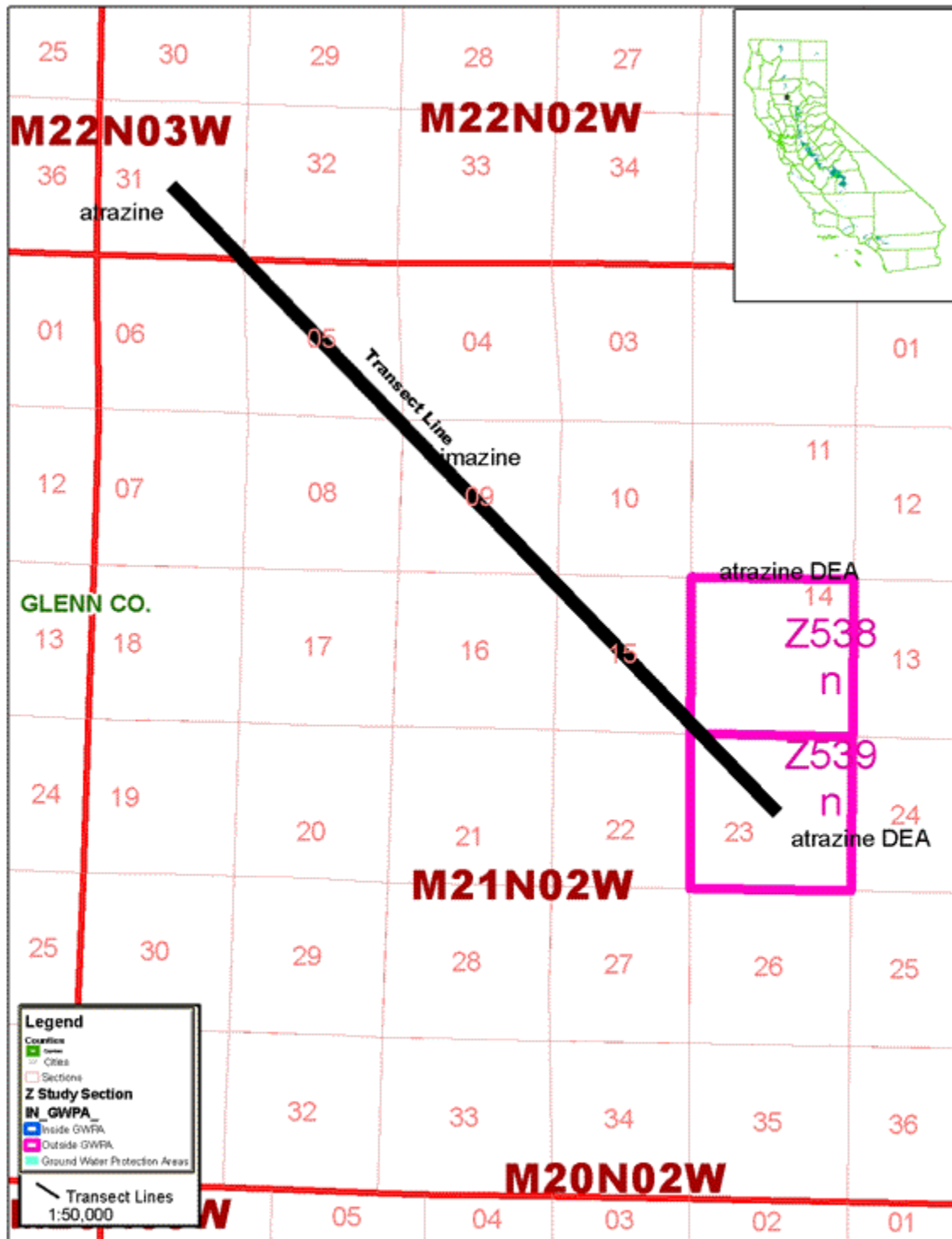


Table D-3 and Figure D-3 detail the Glenn 02 transect south of Glenn extending from section 19N/02W-23 through section 18N/02W-12. Two additional wells will be sampled in each section of the transect except as noted in Table D-3. DPR has previously sampled 11 wells in the transect sections, the latest in 1997 (USGS). Section 19N/02W-23 contains one well with and unverified detection of atrazine. Section 18N/02W-12 is the primary section for four-section survey Z53 (unverified diuron and simazine). The closest GWPA is located three miles to the northwest of the proposed transect. Up to 10 wells may be sampled for this transect.

Table D-3. Glenn County transect 02. See also Figure D-3.

Township, Range, Section	Last Year Sampled for Triazines	Previously Detected Pesticides	Planned Wells to Sample	Sampling Notes
19N/02W-23	1997	Atrazine	2	Very low level of atrazine reported in a well by USGS.
19N/02W-26			2	
19N/02W-35	1988		1	
19N/02W-36	1988		1	
18N/02W-01	1988		2	
18N/02W-12	1997	Diuron, simazine	2	Z536 Diuron and simazine unverified. Low level detection by USGS
<b>Total Wells</b>			<b>10</b>	

Figure D-3. Study 240 Glenn County transect 02.

